POSTSECONDARY DEGREE ATTAINMENT AMONG YOUTH WITH LEARNING DISABILITIES: THE ROLE OF ACADEMIC PREPARATION AND COLLEGE ACADEMIC SUPPORT SERVICES

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A Thesis

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Although the number of youth with disabilities enrolling in postsecondary education has increased over the past few decades, poor postsecondary graduation rates for this population remain a significant concern. This secondary analysis used the National Longitudinal Transition Study-2 dataset to examine the role of high school academic preparation and receipt of postsecondary academic support services in predicting degree attainment among youth with learning disabilities. High school academic preparation variables included completion of a college preparatory curriculum and GPA. Logistic regression analysis revealed that youth with learning disabilities who completed a college prep curriculum were nearly 16 times more likely to graduate from a 2- or 4-year college than those who did not, even after controlling for student demographic characteristics and high school GPA. Furthermore, accessing postsecondary academic support services, such as going to a tutor, a study center, or a writing center, increased the likelihood that youth with learning disabilities would graduate from college only among youth who completed a college prep curriculum. The results underscore the importance of incorporating a college prep curriculum into transition planning for students who have postsecondary education as a transition goal.

Keywords: learning disabilities; postsecondary degree attainment; college prep curriculum; academic support services
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CHAPTER I. INTRODUCTION

The benefits of postsecondary education are clear. Individuals with higher levels of educational attainment are more likely to be employed and earn more than others (Kena et al., 2016; Ma, Pender, & Welch, 2016). Higher levels of education attainment are also associated with healthier lifestyles, increased career options, and greater access to healthcare and retirement plans. The benefits of earning a college degree extend to individuals with disabilities. Youth with disabilities who receive a postsecondary education degree or certificate are more likely to be employed and have higher average wages than those with lower levels of educational attainment (Newman et al., 2011). Furthermore, Madaus (2006) reported that the full-time employment rate and levels of income and employee benefits of a sample of college graduates with learning disabilities was comparable to those of their counterparts without disabilities.

Given these benefits, it is not surprising that youth with and without disabilities are increasingly pursuing postsecondary education. Greater than half of secondary students with learning disabilities have a postsecondary goal of attending a 2- or 4-year college (Cameto, Levine, & Wagner, 2004) and youth with learning disabilities enroll in postsecondary education at rates similar to peers in the general population (Newman et al., 2011). However, there remains a gap in degree attainment between youth with disabilities and their peers without disabilities. Findings from the National Longitudinal Transition Study-2 (NLTS2; Newman et al., 2011) indicate that the postsecondary completion rate of youth with learning disabilities who enroll in postsecondary education is lower (41%) than that of their similar-aged peers in the general population (52%). The discrepancy in completion rates is particularly concerning given that individuals who begin postsecondary education but do not complete their postsecondary programs fail to realize the full economic benefits of graduating from college.
The research evidence suggests that completing postsecondary education is a key to improving postsecondary outcomes for youth with disabilities and to reducing the gap between the postsecondary outcomes of youth with and without disabilities (Cameto et al. 2011; Fleming & Fairweather, 2012; Newman et al., 2011). Students with learning disabilities constitute 35 percent of students with disabilities enrolled in K-12 public schools (U.S. Department of Education, 2016) and 67% of the population of students with disabilities who enroll in postsecondary education (Newman et al., 2011). The lower postsecondary completion rate for these youth compared to their peers in the general population as well as the benefits associated with earning a college degree speak to the need for identifying predictors of postsecondary education success for students with learning disabilities.

Previous research on predictors of postsecondary education outcomes has focused primarily on factors associated with postsecondary enrollment. For example, inclusion in general education, paid work experience, vocational education, goal setting, and youth autonomy have been found to predict postsecondary school enrollment for students with disabilities (Joshi & Bouck, 2017; Mazzotti, Rowe, Sinclair, Poppen, Woods, & Shearer, 2016; Test, Mazzotti, Mustian, Fowler, Kortering, & Kohler, 2009). Considerably less is known about factors that affect and promote postsecondary educational attainment for students with disabilities. Recent studies have identified a limited number of secondary school factors (e.g., effective transition planning and instruction on transition planning) and postsecondary school factors (e.g., academic support and learning strategies instruction) that positively relate to degree attainment (Petcu, 2014; Pingry O’Neill, Markward, & French, 2012; Troiano, Liefeld, & Trachtenberg, 2010). Additional research on factors associated with degree attainment is needed.
To fill in this gap in the research literature, I explored predictors of degree attainment by conducting a secondary analysis of data from the NTLS2 subsample of secondary students with learning disabilities who intended to pursue a college degree. Specifically, I used logistic regression to examine whether two indicators of academic preparation in high school—completion of a college preparatory curriculum and GPA in general education academic coursework—predict the likelihood that youth with learning disabilities will complete postsecondary education. In addition, I examined whether accessing college academic support services such as going to tutor, a study center, or writing center predicts degree completion. The following research questions guided the investigation:

1. After controlling for demographic characteristics, does academic preparation in high school predict postsecondary degree attainment?
2. After controlling for demographic characteristics and high school academic preparation, does receipt of postsecondary academic support services predict degree attainment?
3. Do high school academic preparation and the receipt of postsecondary academic support services interact in the prediction of degree attainment?

Although the scope of the investigation is limited by the design and content of the NLTS2 dataset, the results of this study contribute to the growing body of literature focused on identifying factors that affect and promote postsecondary educational attainment for youth with learning disabilities.

The remainder of this paper is organized as follows. In Chapter 2, I review the extant literature on the postsecondary educational outcomes of youth with disabilities and their relationships to academic preparation for college and receipt of academic support services in college. In Chapter 3, I delineate the steps in the secondary analysis of the NLTS2 dataset,
including a description of sample selection, variable measurement, and data analysis procedures.

I present the results of the analyses related to each research question in Chapter 4. Finally, in
Chapter 5, I discuss study results, implications for practice, study limitations, and
recommendations for future research.
CHAPTER II. LITERATURE REVIEW

Value of a College Degree

The Institute of Higher Education Policy (2005) reported that higher levels of educational attainment correlate to successful employment outcomes in the general population. According to the 2010 American Community Survey (Smith, Grigal, & Sulewski, 2013), the employment rate is 36% for students with disabilities who graduate with a regular high school diploma and it goes up to 52% for students who get an associate degree and 71% for those who attain a bachelor’s degree. Similarly, Newman et al. (2011) found that youth with disabilities who receive a postsecondary education degree have a higher likelihood of attaining employment (83%) than those who have only a high school diploma (38%). In addition, average hourly wages are associated with postsecondary education attainment. Youth with disabilities who received a postsecondary degree had an average hourly wage in 2009 of $12.50 while those who completed only high school had an average hourly wage of $9.50.

Apart from the associated employment outcomes, attainment of a postsecondary education degree is also significantly associated with independent living outcomes for youth with disabilities. They tend to have more financial independence, which is indicated by being more likely to have savings or checking accounts and less likely to receive food stamps. They also tend to socialize more, which means having a higher weekly rate of seeing friends and volunteering for community services (Newman et al., 2011). Furthermore, Ma et al. (2016) reported that higher levels of education were associated with more engagement of parents in their children’s activities. These benefits attest to the value of encouraging postsecondary education for students with disabilities and exploring predictors of degree attainment.
College Preparatory Curriculum

Youth with disabilities are less academically prepared for postsecondary education than their peers in the general population, which may be due in part to the fact that youth with disabilities are less likely to take a college prep curriculum (Horn & Berktold, 1999; Wilson, Hoffman, & McLaughlin, 2009). ACT (2016) recommends that students take a core curriculum in preparation for college consisting of four years of English along with three years each of math, science, and social studies. Using data from National Education Longitudinal Study of 1988 (NELS:88), Horn and Berktold (1999) reported that youth with disabilities who enrolled in postsecondary education had the least likelihood of scoring in the top quartile on the NELS 8th grade composite test (4.2%). Nearly half of them (45.1%) scored in the lowest quartile on the test. They also belonged to the smallest group that took advanced placement courses in high school. Instead, many youth with learning disabilities took remedial English and remedial mathematics (37.8% and 42.6%, respectively). Hitchings, Retish, and Horvath (2005) studied the academic preparation of high school graduates with disabilities who had expressed an interest during high school of attending a 2-year or 4-year postsecondary institution and found that only 5 percent of them (four students) had taken the college preparatory coursework recommended for attending state universities. Of the four students, only one student remained in college prep classes by the end of junior year; the other three students switched to general education or career-oriented courses. In sum, this research suggests that 4-year college preparatory plans of study are not developed or implemented for many students with disabilities who have a goal of attending college.

Wilson et al. (2009) reviewed longitudinal studies focusing on the preparation of youth with disabilities for postsecondary education. When looking at youth who had a goal of attending
college, youth with disabilities had lower GPAs, were less likely to be on a college preparatory track, and completed less advanced math coursework than their peers without disabilities. Wilson et al. stressed the importance of aligning students’ courses of study with their college aspirations. Specifically, they recommended initiating transition planning prior to ninth grade so that students who plan to attend college are encouraged to take Algebra by ninth grade.

**Preparation of Students with Learning Disabilities**

The Individuals with Disabilities Education Act (IDEA) of 2004 defines a specific learning disability as

a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or to do mathematical calculations.

Youth with learning disabilities experience academic difficulties despite typically having average or above average intelligence. Beyond academic difficulties, behavioral characteristics such as problems with organization and self-regulation and difficulties in social interactions often impact the achievement of youth with learning disabilities in postsecondary education (Gerber & Reiff, 1994; Ruban, McCoach, & Nora, 2002; Skinner & Lindstrom, 2003).

A current goal of American high schools is to prepare youth to be college and career ready (Balfanz, 2009). For secondary students with learning disabilities, this mission is even more critical given that members of this population are often supported with academic services such as testing accommodations and curriculum modifications based on specific needs identified in their individualized education programs (IEPs; DaDepoo, 2009). Once they enter postsecondary education, students with learning disabilities will no longer be able to access the same degree of academic support they did in high school and they will be required to self-
identify as a student with a disability in order to receive accommodations (Shaw, Madaus, & Dukes, 2010).

The likelihood that students with learning disabilities will complete a postsecondary education may be increased if they develop the knowledge and skills needed to successfully complete rigorous academic courses in postsecondary education (Milsom & Hartley, 2005). Hitching et al. (2005) suggested that enrolling in college preparatory courses enables students with disabilities to gain the confidence and skills necessary to meet the demands of college-level coursework. The research confirms the importance of taking a college prep curriculum (ACT, 2005; Kirst & Venezia, 2001). Hicks-Coolick and Kurtz (1997) studied the characteristics of students with learning disabilities who were academically successful in college. The study was conducted through in-person interviews with the directors of Learning Disabilities Support Services across nine postsecondary schools. In line with the previously cited studies, these researchers found that one of the essential characteristics that contributes to postsecondary academic success is taking a college prep curriculum in high school.

**High School GPA**

High school grade point average (GPA) is often used to predict academic success in postsecondary education. While not specific to students with learning disabilities, some researchers have found that high school GPA predicts college GPA. Komarraju, Ramsey, and Rinella (2013) conducted a study with a sample of 540 first year college students that aimed to investigate the relationship between high school GPA, college readiness, and college GPA. College readiness was measured by a 108-item inventory that involved academic discipline and study skills, social activities, and academic self-regulation. The researchers found that students with higher high school GPAs earned higher scores on the college readiness inventory,
specifically in the areas of academic discipline, study skills, and academic self-confidence. Then, with regard to college GPA, results showed that high school GPA was moderately correlated with college GPA. Similarly, a study by Sanchez (2013) found that the combination of high school GPA and ACT College Readiness Assessment Composite score accurately predicted students’ first year college GPA for students with a college GPA of 2.5 or above. Consistent with these results, Vogel and Adelman (1992) reported that high school GPA for students with learning disabilities was significantly related to college performance.

Apart from the academic factors that contribute to college success, nonacademic characteristics also play an important role in getting students through graduation, such as students’ persistence in postsecondary education (Camara & Echternacht, 2000). Several studies examined the relationship between high school GPA and students’ persistence in college. McConnell, Martin, and Hennessey (2015) conducted a study in 1,219 participants, including students with disabilities, their family members, and special educators. The Transition Assessment and Goal Generator (TAGG) which consists of 34 items covering 8 constructs, such as persistence, goal setting and attainment, and disability awareness, was used to measure postsecondary education outcomes. GPA in core courses (English, math, science, and social studies) was calculated as the independent variable. Based on responses from special educators, a moderate correlation was found between GPA and persistence in college. Astin, Tsui, and Acalos (1996) also reported that students with higher high school GPAs were more likely to graduate from postsecondary schools.

The previous studies discussed did not focus directly on exploring the relationship between high school GPA and college success for students with learning disabilities. DaDeppo (2009) stated that students with learning disabilities tend to have lower GPAs in high school;
therefore integrating GPA with other factors would build an appropriate model to predict college success for this population. In DaDeppo’s research, academic achievement, including high school GPA and SAT scores, was integrated with socialization in postsecondary education (such as interacting with peers and faculty) as a model to examine postsecondary success for students with learning disabilities. The result suggested that this integration model significantly predicted persistence in postsecondary education.

**Postsecondary Academic Support Services**

Federal law requires that accommodations be provided to students with disabilities to enable them to access academic instruction in postsecondary institutions. In order to receive accommodations, students must self-disclose their disabilities by providing related documentation (GAO, 2009). Self-disclosure of disabilities is voluntary. If students do not disclose their disabilities, it is not the postsecondary institution’s responsibility to provide accommodations (Madaus, 2005). Newman et al. (2011) reported that only 28 percent of students with disabilities who received special education services in secondary school self-disclosed their disabilities to postsecondary institutions. Among these students, 70 percent received accommodations from their postsecondary institutions. Students with learning disabilities were less likely to receive accommodations and other disability-specific services in 2-year and 4-year institutions than students with other disabilities (Newman & Madaus, 2015). Klassen (2002) suggests that a possible reason for this situation is that students with learning disabilities appear to overestimate their abilities to perform academic tasks in postsecondary institutions. Interestingly, Cameto, Knokey, and Sanford (2011) found that youth with learning disabilities tend to take advantage of academic support services, such as tutoring, that do not require disability disclosure.
To meet the diverse needs of the increasing number of students with learning disabilities in postsecondary education, an inclusive academic support service that is available to any student, anytime, and any place is recommended (DeLee, 2015; Walker, 2016). Academic support services in postsecondary institutions refer to the services that provide students with extra support beyond classroom instruction, such as tutoring services, counseling, writing centers, and math labs. Such support services are available to students independent of whether they inform the school of a disability because these services are provided to all students regardless of disability status (Sparks & Lovett, 2013; Walker, 2016).

Newman et al. (2011) reported in the NLTS2 study that poor grades were one of the common reasons students with disabilities cited for not completing their postsecondary programs. Likewise, a lack of quality academic support services was identified as a factor that prevents students with learning disabilities from attaining a postsecondary degree (Hernandez, 2012). In a study by Vogel and Adelman (1990), the receipt of academic support services in postsecondary education improved the academic performance of students with learning disabilities. The researchers compared 110 students with learning disabilities to a random sample of nondisabled peers regarding their graduation and academic failure rate in the same postsecondary school. The group of students with learning disabilities (LD) received LD support services for at least one semester, while the group of nondisabled peers was not referred for such services. The LD support services focused on assisting students with learning disabilities through course specific tutoring, improving basic academic skills, and developing learning strategies. The results showed that the LD group and peer group had almost identical academic failure rates (18% v. 17%, respectively) and very close graduation rates (37% v. 39%, respectively). The
results suggest that such support services effectively reduce the academic gap between students with learning disabilities and their nondisabled peers.

Troiano, Liefeld, and Trachtenbert (2010) investigated the relationship between the frequency of receiving academic support services and college success measured by GPA and college graduation. The academic support services examined in this study included note-taking, test preparation, writing strategies, and time management skill development. Results showed that youth with learning disabilities who consistently received academic support services were more likely to graduate from college. Meanwhile, compared to youth who did not receive consistent academic support services, this group of participants tended to have higher GPAs with most of them earning GPAs greater than 3.5. Similarly, Lock and Layton (2008) studied the influence of tutoring participation on the GPAs of 530 college students with learning disabilities. Tutoring participation was divided into two categories: four or fewer absences and five or more absences within a study period of nine semesters. The researchers found that students who attended tutoring services with four or fewer absences in nine semesters achieved higher GPAs than students who attended tutoring services with five or more absences during this same period.

More recently, while not specific to students with learning disabilities, Pingry O'Neill, Markward, and French (2012) conducted a survey at three universities to collect data on demographic characteristics, receipt of academic/non-academic services, and graduation status of students with disabilities. Academic services in this study included accommodations such as extended testing time and a distraction-reduced testing environment and learning strategies/study skills assistance in areas such as reading comprehension and writing skills. Results showed that assistance on learning strategies/study skills was significantly related to graduation, and specifically, those who received such assistance were 2.4 times more likely to graduate.
Current Study

The purpose of this study was to explore the impact of high school academic preparation and postsecondary academic support services on postsecondary degree attainment for students with learning disabilities, while controlling for student demographic characteristics including gender, ethnicity, and household income level. Previous research has mainly focused on studying the influence of high school academic preparation on postsecondary enrollment (see Test et al., 2009) and receipt of accommodations in postsecondary education (e.g., Newman & Madaus, 2015). For the purpose of this study, factors were first examined individually and then the interaction between high school academic preparation and postsecondary academic support services was further investigated. It was hypothesized that high school academic preparation—including completing a college prep curriculum and high school GPA—would predict postsecondary degree attainment. Then, the receipt of postsecondary academic support services (PASS) was hypothesized to increase the likelihood of degree attainment. Finally, it seems likely that academic support in college might be insufficient to overcome student deficiencies in high school academic preparation. Therefore, it was hypothesized that the interaction between high school academic preparation and academic support services moderates the relationship between postsecondary academic support services and degree attainment. The hypothesized models are illustrated in Figure 1.
Figure 1. Hypothesized Models of Degree Attainment

Model 1

- Control variables
- HS academic preparation

- College prep curriculum
- High school GPA

Model 2

- Control variables
- PASS

- PASS*college prep curriculum

- HS academic preparation
- PASS*high school GPA

Note. PASS = postsecondary academic support services.
CHAPTER III. METHODS

**NLTS2 Dataset**

This study is a secondary analysis of data from NLTS2. Funded by the U.S. Department of Education, NLTS2 is a nationally representative dataset comprising data on the secondary and postsecondary experiences and outcomes of students who received special education services in 2000. Data were collected across 5 waves, every 2 years, from 2001-2009. Over 11,000 youth 13-16 years of age began the study in 2001. By Wave 5 (2009), sample members ranged in age from 21-25 years old. Access to the data was granted through an Institute of Education Sciences (IES) Restricted-use Data License (Appendix A).

NLTS2 employed a two-stage sampling plan (SRI International, 2000). First, local school districts and state-supported special schools stratified by geographic area, student enrollment, and community wealth were randomly sampled. Second, students from selected school districts and special schools were stratified by the 12 federally recognized disability categories and then study participants were randomly selected from each disability category. Responses were weighted based on various district and youth characteristics to ensure that study findings would be representative of the national population of youth who received special education services in 2000. For example, participants with learning disabilities constituted 60 percent of the unweighted sample but 88 percent of the weighted population. Details of the weighting strategy are described in Newman et al. (2011).

NLTS2 data were collected from youth, parents, and schools. Data were collected from telephone interviews and/or surveys of youth and parents across the five waves of data collection; assessment of students’ academic achievement and self-determination skills; high school transcripts; and school staff surveys about school characteristics and policies as well as
about the individual school programs of youth in the study sample. The majority of key items about the youth were answered by the youth themselves. If an eligible youth did not complete a survey or if a youth was reported by parents not to be able to respond to the questions, responses were provided by parents. Additional information about data sources can be found in Newman et al. (2011).

Sample

The sample for the present study included youth from the larger NLTS2 database who (a) were identified on the school district roster as having a learning disability as their primary disability category, (b) had a goal of graduating from a 2- or 4-year college, (c) were enrolled in secondary school in Wave 1 (2001) and/or Wave 2 (2003), and (d) had a valid value on the dependent measure (i.e., degree attainment) for the wave in which they had been out of high school for 5-6 years. The decision to limit the sample to youth who intended to pursue a college degree was intended to focus the analysis on tracking the progress of college-bound students with learning disabilities over the 5-6 years following high school. Youth were asked, “How likely do you think it is that you will graduate from a 2-year [4-year] college?” with four response choices: definitely will, probably will, probably won’t, and definitely won’t. Youth who responded that they definitely will or probably will graduate from either a 2-year or a 4-year postsecondary institution were included in the study sample. If youth responses were not available, parents’ responses were used. The final sample for this study was 150 youth with learning disabilities who planned to pursue a college degree. Unweighted sample sizes were rounded to the nearest 10 throughout this report in compliance with IES rules for using restricted datasets. See Table 1 in Appendix B for the data sources of variables used in sample selection.
Measure

**Dependent variable.** Attainment of a 2- or 4-year postsecondary degree within 5-6 years after high school was the dependent variable in the analyses. The data sources for this variable were Wave 4 and 5 parent and youth interviews/surveys. Participants were asked two questions: “Have you gotten a diploma, certificate, or license from a 2-year or community college?” and “Have you gotten a diploma, certificate, or license from a 4-year college or university?” Youth who answered *yes* to one or both of these questions were dichotomously coded as having attained a postsecondary degree (1 = *yes*). Table 1 in Appendix B displays the variable names and data sources of study measures.

**Independent variables.** Two measures of academic preparation during high school were selected: completion of a college prep curriculum and GPA in academic coursework in general education settings. The data source for both variables was high school transcripts. Youth were dichotomously coded as having completed a college prep curriculum (1 = *yes*) if they received passing grades in a minimum number of credits of core academic coursework in general education settings: 4 credits in English, 3 in math, 3 in social studies, and 3 in science (Newman & Madaus, 2015). GPA was calculated on a 0-4 scale based on students’ overall GPA in core academic coursework and foreign language courses in general education settings. For those youth who had missing data on this variable, GPA was supplemented by averaging the student’s GPA for each grade for which data was available. A final independent variable was receipt of postsecondary academic support services (PASS). The data source for this variable was parent/youth surveys for Waves 2, 3, 4, and 5. The 90 youth who enrolled in a 2-year and/or 4-year postsecondary institution were asked, “Did you ever get help with school work from this school, like going to a tutor, a study center, or writing center?” A youth’s response of *yes* to this
question for one or both types of postsecondary institutions in any wave was coded 1, and the response of all other youth was coded 0 (no).

**Control variables.** Three student demographic characteristics were included as control variables in the present study: gender, ethnicity, and household income level. These variables were selected for inclusion in the analysis on the basis of the NLTS2 conceptual model (Wagner, et al., 2003) and prior research findings related to student and family characteristics that influence postsecondary outcomes (e.g., Baer, Daviso III, Flexer, McMahan Queen, & Meindl, 2011; Fairweather & Shaver, 1990; Petcu, 2016). Data on these variables were collected primarily from the parent survey at Wave 1 and were supplemented by parent data from other waves. Gender was coded as 1 = male and 2 = female. Ethnicity was dichotomously recoded into two categories: 1 = White; 0 = Non-white. Household income level was coded based on the three response categories in the parent survey: 1 = $25,000 or less; 2 = $25,001-50,000; 3 = more than $50,000.

**Data Analysis**

The only variable with missing values was high school GPA and less than 5% of values for this variable were missing. As recommended by Newman (2014), missing data for high school GPA were imputed using the Expectation Maximization (EM) method. No data were imputed for the descriptive statistics.

The SPSS 24.0 Complex Samples Module was used to perform statistical analyses in order to obtain point estimates representative of the national population of youth with learning disabilities in the NLTS2 age range and time frame (SRI International, 2000). The complex samples module accounts for the NLTS2 stratified/clustered sampling design through the use of
Taylor linearization to produce weighted standard errors. Data were weighted by using the cross-wave, multi-source weight Wt_Any recommended by Valdes et al. (2013).

Descriptive statistics such as frequency distributions and means were calculated for variables included in the analyses. Bivariate relationships (simple correlations) among each pair of variables were also examined. Logistic regression analysis was used to examine the ability of high school academic preparation and receipt of postsecondary academic support services (PASS) to predict the likelihood of degree attainment for youth with learning disabilities. Two models were tested. In both models, gender, ethnicity, and family income level were entered as control variables and postsecondary degree attainment was entered as the dependent variable. The lower value (0 = did not attain degree) was set as the reference category. In the first model, completion of a college prep curriculum and high school GPA were entered as independent variables. This model provided a test of whether better academic preparation in high school increases the likelihood that youth with learning disabilities will graduate from college (Research Question 1). In the second model, receipt of PASS as well as interaction terms between PASS and each of the two academic preparation variables were added as independent variables in the regression equation. This model provided a test of whether receiving PASS alone or in combination with better academic preparation in high school increases the likelihood that youth with learning disabilities will graduate from college (Research Questions 2 & 3). To facilitate interpretation of regression results, pseudo R²s for each model were calculated and coefficients (B), standard errors (SE), odds ratios (OR), significance levels, and confidence intervals (CI) were computed for each variable in the models.

Model assumptions were evaluated prior to running the logistic regression models (Hosmer, Lameshow, & Sturdivant, 2013). Linearity of the logit was assessed by examining the
Nagelkerke $R^2$ in both models. Statistically significant Nagelkerke $R^2$'s for the models suggested that this assumption was met. To assess multicollinearity between predictors in the regression models, a correlation matrix was created. No coefficient in the matrix was higher than .8 suggesting that multicollinearity was also not an issue. Moreover, an examination of *Cook’s distances* revealed that no Cook’s distances values exceeded 1 suggesting that no cases were unduly influencing the models. Therefore, no major issues were identified during the model diagnostics.
CHAPTER IV. RESULTS

The sample for this NLTS2 secondary analysis was students with learning disabilities who intended to pursue a college degree. These students were more likely to be male (64%) and identified as White (v. non-White) in terms of ethnicity (70%). Over half were from households with incomes exceeding $50,000 (54%), while slightly less than a quarter were from households with incomes of $25,001-$50,000 (24%) and households with incomes of $25,000 or less (23%). Regarding the academic preparation of the youth during high school, only 24% completed the core curriculum in English, math, social studies, and science; their mean GPA in academic coursework in general education settings was 2.09 (SE = .06).

Sixty percent of youth with learning disabilities who intended to pursue a college degree had enrolled in college at some point during the 5-6 years following high school. Of those who enrolled in college, 57% received academic support from their postsecondary institution (e.g., tutor, study center, writing center). In total, one-third (33%) of those who intended to pursue a college degree achieved this goal within the 5-6 years following high school. Newman et al. (2011) provide more comprehensive information about the postsecondary school experiences and outcomes of the larger NLTS2 sample.

Table 2 in Appendix B presents the bivariate relationships among study variables. A review of the simple correlations reveals that gender was not significantly related to the independent or dependent variables, and ethnicity was significantly related only to high school GPA. However, household income level was positively related to all independent and dependent variables including completing a college prep curriculum, high school GPA, receipt of PASS, and postsecondary degree attainment. Completing a college prep curriculum was also positively related to high school GPA, receipt of PASS, and postsecondary degree attainment. Table 3 in
Appendix B presents the results of logistic regression analyses relating youths’ demographic characteristics, high school academic preparation, and receipt of postsecondary academic support services to degree attainment.

**High School Academic Preparation**

The first research question examined whether academic preparation in high school predicts postsecondary degree attainment of youth with learning disabilities after controlling for gender, ethnicity, and household income level. Results presented in Model 1 of Table 3 in Appendix B reveal that completion of a college prep curriculum was significantly related to postsecondary degree attainment. Youth with learning disabilities who completed a college prep curriculum were over five times more likely to attain a college degree ($OR = 5.31, p < .001$). No significant relationship was found between high school GPA and postsecondary education degree attainment. Household income level was the only control variable that predicted degree attainment. Specifically, youth whose household income was $25,001-50,000 were about a sixth as likely to attain a college degree as those whose household income was greater than $50,000 ($OR = .16, p = .002$).

**Postsecondary Academic Support Services**

The second research question examined whether receipt of PASS predicts postsecondary degree attainment over and above what is explained by youth’s demographic characteristics and high school academic preparation. A final research question took a closer look at the relationships between PASS and high school academic preparation variables in predicting postsecondary degree attainment in the model. Specifically, the third research question investigated whether the interaction between PASS and completion of a college prep curriculum and/or the interaction between PASS and high school GPA predicts postsecondary degree
attainment. Regression results related to Research Questions 2 and 3 are presented in Model 2 of Table 3 in Appendix B.

Analysis revealed that receipt of PASS did not make a significant independent contribution to the prediction of postsecondary degree attainment (\(OR = 2.06, p = .64\)) and the PASS X GPA interaction was not significant (\(OR = .88, p = .85\)). However, the PASS X College Prep Curriculum interaction was a significant predictor in the model (\(OR = .07, p = .04\)). The pattern of results for the interaction suggests that, among youth who completed a college prep curriculum, receiving PASS significantly improved the likelihood that they would attain a college degree (i.e. 88% of those who received PASS attained a degree compared to only 57% of those who did not receive PASS). By contrast, among youth who did not complete a college prep curriculum, receiving PASS did not significantly impact the likelihood that they would attain a college degree (i.e. 37% of those who received PASS attained a degree compared to 42% of those who did not receive PASS). Of note, completion of a college prep curriculum remained a significant predictor of postsecondary degree attainment in Model 2, with youth who completed a college prep curriculum being almost 16 times more likely to attain a college degree (\(OR = 15.80, p = .002\)).
CHAPTER V. DISCUSSION

The purpose of current study was to identify predictors of postsecondary degree attainment for students with learning disabilities, while controlling for student demographic characteristics. This study may be the first to explore the interaction between high school academic preparation and receipt of postsecondary academic support services in predicting postsecondary degree attainment. Completing a college prep curriculum in the current study was defined as taking at least 4 credits in English, 3 in math, 3 in social studies, and 3 in science in the general education setting. High school GPA in this study referred to GPA in core academic coursework and foreign language courses in the general education setting.

Three main findings emerged from the data. First, youth with learning disabilities who completed a college prep curriculum were more likely to graduate from postsecondary education, even after controlling for student demographic characteristics (gender, ethnicity, and household income level). This finding mirrors previous research demonstrating a relationship between completing a college prep curriculum and postsecondary academic success (Hicks-Coolick & Kurtz, 1997; Milsom & Hartley, 2005). Completing a college prep curriculum appears to be an important factor in predicting graduation from postsecondary education. As theorized by Kirst and Venezia (2001), the typical high school curriculum is not rigorous enough to prepare youth for college coursework. This seems particularly true for students with learning disabilities who are less likely to complete advanced coursework (Wilson et al., 2009) and more likely to take remedial coursework (Horn & Berktold, 1999) than their peers without disabilities.

In current study, the development of content knowledge, study skills, and self-regulation skills gained from completing a college prep curriculum (ACT, 2005; Hitchings, et al., 2005) appears to have contributed to postsecondary degree attainment for students with learning
disabilities. It is also possible that taking a college prep curriculum increased the intent to persist in college for these students. In a study by DaDeppo (2009), academic integration (i.e., satisfaction with academic experience) and social integration (i.e., interaction with peers and faculty) in college were found to be powerful predictors of persistence in college for students with learning disabilities. Therefore, it is likely that youth who took a college prep curriculum persisted in college in part because they had a more satisfying academic experience and better socialization in college.

Unexpectedly, having a higher high school GPA did not increase the likelihood of college graduation for youth with learning disabilities. The bivariate correlation between GPA and degree attainment was not significant, and GPA was not a significant predictor of degree attainment in either Model 1 or Model 2. Previous research found that high school GPA is positively related to college GPA and intent to persist in college for the general population (McConnell et al., 2015; Komarraju et al., 2013; Sanchez, 2013; Vogel & Adelman, 1992). The inconsistency between the findings of this study and previous studies might have several explanations. For example, unlike previous research that calculated GPA based on all coursework taken in high school, GPA in the current study referred more narrowly to GPA in core academic coursework and foreign language courses. There might be differences in GPA when including other coursework such as art, music, and career-technical classes. In addition, the current study did not measure college GPA or intent to persist as previous research did so there is uncertainty regarding whether high school GPA predicts college GPA. Finally, previous research did not assess the relationship between GPA and postsecondary degree attainment as the current study did; therefore it cannot be determined if students with higher college GPAs are more likely to graduate from college.
Second, after controlling for student demographic characteristics and high school academic preparation, PASS by itself did not improve the likelihood of graduating from postsecondary education for youth with learning disabilities. The bivariate correlation between PASS and degree attainment was also not significant. These findings appear to be inconsistent with previous research demonstrating a positive relationship between frequency of receiving academic support services and college graduation for students with learning disabilities (Lock & Layton, 2008; Troiano et al., 2010). A plausible explanation for this apparent inconsistency may be the nature of the survey question in the current study. Participants were asked, “Did you ever get help with school work from this school, like going to a tutor, a study center, or writing center?” Their responses indicated only whether they received support services, not the frequency of receiving those services or the quality of services. Therefore, it is plausible that students with learning disabilities in the current study who reported receiving PASS did not receive sufficient frequency or intensity of academic support services to increase their likelihood of graduating from college. Further, only three services were mentioned in the survey question, so it is possible that students with learning disabilities who received other types of PASS (e.g., reading comprehension or learning skills instruction) responded no to the question.

Third, the effect of receiving PASS on graduation was moderated by the completion of a college prep curriculum. Specifically, among youth with learning disabilities who completed a college prep curriculum, receipt of academic support services increased the likelihood they would graduate from college. However, among those who did not complete a college prep curriculum, the receipt of academic support services did not significantly increase their likelihood of graduation. In other words, receiving academic support services in college was only helpful to students with learning disabilities who had the foundation of a college prep
This is a unique finding in the current study. One of the changes students face in postsecondary education is that college instructors do not teach the same way high school teachers teach (Shaw, Madaus, & Dukes, 2010). Instructors in college impart more information and lecture more abstract concepts in a limited time. Students who take a college prep curriculum may be better prepared for these changes. They may also gain confidence and skills required to be successful in college (Hitching et al., 2005). If students do not take college prep coursework to establish college curriculum readiness, academic support services may be insufficient to make up for this lack in preparation. This provides a plausible explanation for why the receipt of college academic support services alone was not a significant predictor of graduation.

**Implications**

The finding that completing a college prep curriculum improves the likelihood of graduating from college for youth with learning disabilities suggests that taking a college prep curriculum should be incorporated into transition planning for youth who have postsecondary education as a transition goal. Unfortunately, few students with learning disabilities whose career goals require postsecondary education have IEP plans that support their postsecondary goals (Hitching et al., 2005). The findings of this study reinforce the importance of beginning transition planning early for youth who intend to attend college. This will require students and their IEP teams to lay out a high school course of study prior to age 16 as currently required by the Individuals with Disabilities Education Act.

The unique finding that the effect of receiving postsecondary academic support services on degree attainment is moderated by completion of a college prep curriculum further underscores the need for college-bound youth with learning disabilities to complete a college prep curriculum. In addition, youth who enter college academically prepared should be
encouraged to take full advantage of the academic support services provided by their postsecondary institutions. With the strong base of a college prep curriculum and access to postsecondary academic support services, youth with learning disabilities will be better equipped to pursue and attain a college degree.

Limitations

There are several limitations in this study. First, the study was limited due to the design of NLTS2. Some of the survey questions did not fully explore the nature of constructs of interest in this study. For example, the survey question about PASS did not indicate the frequency or quality of academic support services received. Therefore, it is difficult to compare the results of this study with results of previous research regarding the relationship between PASS and postsecondary degree attainment. Also, the dataset indicated the number of courses taken in each core academic area (English, math, science, social studies) but did not identify specific course titles on the transcript. Therefore, a student who took Algebra 2, Geometry, and Pre-calculus and a student who took three remedial math classes would both have a response of 3 for “number of mathematics courses taken.” Second, the results of this study cannot be used to imply causal relationships among study variables. It is possible that other factors not accounted for in this study impact both the independent variables and dependent variable. For example, it is possible that students with higher academic aptitudes are both more likely to take a college prep curriculum and more likely to graduate from college. In this example, aptitude may be a causal variable that accounts for the relationship between the independent variable and dependent variable. Finally, the study sample was limited to youth with learning disabilities who had a postsecondary education goal while they were still in high school. Therefore, the results of the
study cannot be generalized to the population of all high school students with learning disabilities in the U.S.

**Recommendations for Future Research**

Given the findings of the current study, future research should take the following directions. First, future studies should examine whether the predictors of postsecondary degree attainment for students with learning disabilities are applicable to students with other disabilities. This research would expand the generalizability of the current study findings. Second, to further explore the relationship found between college prep curriculum and postsecondary degree attainment, researchers should explore interactions between college prep curriculum and other factors such as high school GPA and household income level in predicting postsecondary degree attainment. Finally, based on the limitations stated earlier, additional research needs to be done to examine the role of postsecondary academic support services in predicting college graduation. For example, sample selection might be expanded to include all youth with disabilities in the NLTS2 dataset who intended to pursue a postsecondary degree. Or, researchers might further investigate the frequency, quality, and usefulness of academic support services received by youth with learning disabilities in college. An example of a question in NLTS2 that may provide relevant data is “How useful have all the services, accommodations, and help with school work been in helping you stay in school and do you best there?”

**Conclusion**

In this study, a secondary analysis of NLTS2 data was used to identify predictors of postsecondary degree attainment. Study findings suggest that completing a college prep curriculum paves the way for postsecondary degree attainment for students with learning
disabilities, and postsecondary academic support services play an additive role in supporting college success for those students who complete a college prep curriculum.
REFERENCES


of preparation, participation, and outcomes. *National Center for Education Statistics.*


Individuals with Disabilities Education Act, 34 CFR 300.8(c) (10) (2004)


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2. The SO has the legal authority to bind the organization to the provisions of this License; and

3. The PPO is the most senior subject matter officer for the Licensee who has the authority to manage the day-to-day statistical, research, or evaluation operations of the Licensee.

[Signature of the Senior Official]

[Date: 10-10-16]

Name: Thomas Kornacki

Title: Director, Office of Sponsored Programs and Research, BGSU

Telephone: (419) 372-2481

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[Signature of the Principal Project Officer]

[Date: 10/12/16]

Name: Jeanne Novak

Title: Associate Professor, Special Education

Telephone: (419) 372-6826
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Signature of Director of IES or Designee

Acting Commissioner

Title

Peggy G. Carr

Type/Print Name of Director of IES or Designee

Date DEC 09 2016

IES License Control Number: 16070037
### APPENDIX B. TABLES

**NLTS2 Variable Names and Data Sources of Sample Selection and Analysis Variables**

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<tr>
<th>Variable</th>
<th>Variable names</th>
<th>Data sources</th>
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<td><strong>Sample selection variables</strong></td>
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<td>Learning disability</td>
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<td>School district roster</td>
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<td>Expectation to graduate from 2-year and/or 4-year college</td>
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<td>Transcripts</td>
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<td><strong>Control variables</strong></td>
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(supplemented by Waves 2 & 3)
Note. HS GPA = high school grade point average in academic courses in general education settings; PASS = postsecondary academic support services.
Table 2.

Simple Correlations Among Study Variables

<table>
<thead>
<tr>
<th></th>
<th>Student demographics</th>
<th>Academic preparation</th>
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<th>Degree</th>
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<td>3</td>
<td>4</td>
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<td>2. Ethnicity (white)</td>
<td>-.20**</td>
<td>1</td>
<td></td>
<td></td>
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<tr>
<td>3. Household income level</td>
<td>-.17</td>
<td>.14</td>
<td>1</td>
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</tr>
<tr>
<td>4. College prep curriculum</td>
<td>-.03</td>
<td>.11</td>
<td>.27*</td>
<td>1</td>
</tr>
<tr>
<td>5. HS GPA</td>
<td>-.09</td>
<td>.28***</td>
<td>.27***</td>
<td>.32***</td>
</tr>
<tr>
<td>6. PASS (received)a</td>
<td>.15</td>
<td>-.11</td>
<td>.22*</td>
<td>.24**</td>
</tr>
<tr>
<td>7. Degree (attained)</td>
<td>.05</td>
<td>.08</td>
<td>.33***</td>
<td>.41***</td>
</tr>
</tbody>
</table>

Note. Unweighted sample size numbers were rounded to the nearest 10 as required by the Institute of Education Sciences. HS GPA = high school grade point average in academic courses in general education settings; PASS = postsecondary academic support services.

aSample size for PASS correlations = 90.

*p < .05. **p < .01. ***p < .001.
Table 3.

Logistic Regression Analysis Examining Predictors of Postsecondary Degree Attainment

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE</th>
<th>OR</th>
<th>95% CI</th>
<th>B</th>
<th>SE</th>
<th>OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-1.05</td>
<td>.69</td>
<td>.35</td>
<td>[.09, 1.38]</td>
<td>.65</td>
<td>1.33</td>
<td>1.91</td>
<td>[.13, 28.37]</td>
</tr>
<tr>
<td>Student demographics</td>
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<tr>
<td>Gender (male v. female)</td>
<td>.18</td>
<td>.39</td>
<td>1.19</td>
<td>[.55, 2.59]</td>
<td>.39</td>
<td>.48</td>
<td>1.47</td>
<td>[.55, 3.91]</td>
</tr>
<tr>
<td>Ethnicity (non-white v. white)</td>
<td>-.04</td>
<td>.42</td>
<td>.96</td>
<td>[.42, 2.22]</td>
<td>-.35</td>
<td>.52</td>
<td>.71</td>
<td>[.25, 2.03]</td>
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<tr>
<td>Household income level</td>
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<td></td>
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<td></td>
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<tr>
<td>(compared with &gt;$50,000)</td>
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<td></td>
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<td></td>
<td></td>
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<tr>
<td>≤$25,000</td>
<td>-1.17</td>
<td>.61</td>
<td>.31</td>
<td>[.09, 1.04]</td>
<td>-1.05</td>
<td>.55</td>
<td>.35</td>
<td>[.12, 1.06]</td>
</tr>
<tr>
<td>$25,001-50,000</td>
<td>-1.86</td>
<td>.58</td>
<td>.16**</td>
<td>[.05, .50]</td>
<td>-2.33</td>
<td>.73</td>
<td>.10**</td>
<td>[.02, .43]</td>
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<td>HS academic preparation</td>
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<tr>
<td>College prep curriculum</td>
<td>1.67</td>
<td>.41</td>
<td>5.31***</td>
<td>[2.35, 11.98]</td>
<td>2.76</td>
<td>.82</td>
<td>15.80**</td>
<td>[2.98, 83.65]</td>
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<tr>
<td>GPA</td>
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<td>.24</td>
<td>1.17</td>
<td>[.73, 1.87]</td>
<td>-.35</td>
<td>.51</td>
<td>.71</td>
<td>[.25, 1.96]</td>
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<tr>
<td>Receipt of PASS</td>
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<td>PASS * college prep curriculum</td>
<td>-2.63</td>
<td>1.23</td>
<td>.07*</td>
<td>[.01, .86]</td>
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<tr>
<td>PASS * GPA</td>
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<td>.68</td>
<td>.88</td>
<td>[.22, 3.48]</td>
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<td>$N$</td>
<td>150</td>
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<td>Cox and Snell</td>
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<td>McFadden</td>
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</table>

*Note. Unweighted sample size numbers were rounded to the nearest 10 as required by IES. HS = high school; GPA = grade point average in academic courses in general education settings; PASS = postsecondary academic support services; OR = odds ratio; CI = confidence interval.*

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