COMPLETING COLLEGE: A LONGITUDINAL EXAMINATION OF POTENTIAL ANTECEDEENTS OF SUCCESS IN POST-SECONDARY EDUCATION FOR STUDENTS WITH DISABILITIES

Edwin Achola
Virginia Commonwealth University

Follow this and additional works at: https://scholarscompass.vcu.edu/etd

Part of the Education Commons

© The Author

Downloaded from
https://scholarscompass.vcu.edu/etd/3199

This Dissertation is brought to you for free and open access by the Graduate School at VCU Scholars Compass. It has been accepted for inclusion in Theses and Dissertations by an authorized administrator of VCU Scholars Compass. For more information, please contact libcompass@vcu.edu.
COMPLETING COLLEGE: A LONGITUDINAL EXAMINATION OF POTENTIAL ANTECEDENTS OF SUCCESS IN POSTSECONDARY EDUCATION FOR STUDENTS WITH DISABILITIES

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy at Virginia Commonwealth University

By

Edwin Obilo Achola
Bachelor of Education (Secondary English), Maseno University, 2006
Master of Education (Special Education), Indiana University of Pennsylvania, 2009

Director: Colleen Thoma, Ph.D.
Professor, Department of Special Education and Disability Policy
School of Education

Virginia Commonwealth University
Richmond, Virginia.
July 2013
Acknowledgement

My sincerest thanks to the following people: My advisor and friend Dr. Colleen Thoma, for mentoring, encouraging, and inspiring me throughout my doctoral studies. My committee members: Dr. Donald Oswald, Dr. Lee Zhang, Dr. Kevin Sutherland and Dr. Chin-Chih Chen. The consistent and prompt feedback was invaluable. I am forever grateful for the many hours of peer reviews and expertise that my fellow doctoral students and colleagues offered. Heartfelt thanks goes to Dr. Colleen Thoma, dissertation committee chair. She never gave up on me and served as a steadfast advocate and source of inspiration for this study. I am grateful for her constructive feedback that was always prompt and extensive. Her steadfast advocacy, mentorship, words of encouragement, and high expectations made the completion of this dissertation possible. I have the highest respect and admiration for Dr. Thoma. It has been an honor to be her advisee.
Dedication

This dissertation is dedicated to my wonderful supportive family. My mom (Minwa Nyar Kisian) this would have never been possible without your daily prayers. I owe a debt of gratitude to my father (Willis) who encouraged me and financially supported me so that I could realize my dream. My brothers Joab and Dick, nephew Jamaine, sister in law Eve, sisters Maurine, Sally, Vally and Lizz have given me vast encouragement and selfless sacrifice to see me through.
Table of Contents

List of Tables ........................................................................................................................................viii
List of Figures .........................................................................................................................................ix
Abstract ..................................................................................................................................................x
Chapter 1 INTRODUCTION......................................................................................................................2
Implications of Post-secondary Education Completion ...........................................................................3
Legislation Promoting Participation in Post-secondary Education ............................................................4
  No Child Left Behind Act, 2001 (P.L, 107-110) .............................................................................5
  Individuals with Disabilities Education Improvement Act (IDEIA), 2004 (P.L. 108-466) ......................5
  Higher Education Opportunity Act 2008 (P. L. 110, 315) ..............................................................7
Overview of Study .................................................................................................................................8
Statement of Problem ..............................................................................................................................9
Conceptual Framework ..........................................................................................................................10
  Student Integration Model ..................................................................................................................10
Purpose of Study ....................................................................................................................................11
Rationale and Significance of Study .......................................................................................................12
Research Background ............................................................................................................................13
  Pre-entry variables ...............................................................................................................................13
  Post-secondary education academic systems .....................................................................................15
  Post-secondary education social systems .........................................................................................15
Hypotheses ..............................................................................................................................................17
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research design</td>
<td>18</td>
</tr>
<tr>
<td>Instruments</td>
<td>18</td>
</tr>
<tr>
<td>Summary</td>
<td>19</td>
</tr>
<tr>
<td>Chapter 2 LITERATURE REVIEW</td>
<td>20</td>
</tr>
<tr>
<td>Introduction</td>
<td>20</td>
</tr>
<tr>
<td>Tinto’s Student Integration Model</td>
<td>21</td>
</tr>
<tr>
<td>Pre-entry Factors Affecting Post-secondary Education Success</td>
<td>26</td>
</tr>
<tr>
<td>Family background and student characteristics</td>
<td>26</td>
</tr>
<tr>
<td>Skills and Abilities</td>
<td>29</td>
</tr>
<tr>
<td>High School Experiences</td>
<td>32</td>
</tr>
<tr>
<td>Goals/Intentions</td>
<td>36</td>
</tr>
<tr>
<td>Commitments</td>
<td>41</td>
</tr>
<tr>
<td>Social Integration</td>
<td>43</td>
</tr>
<tr>
<td>Definition</td>
<td>43</td>
</tr>
<tr>
<td>Social Integration Experiences</td>
<td>45</td>
</tr>
<tr>
<td>Social Integration and Persistence in PSE</td>
<td>48</td>
</tr>
<tr>
<td>Synthesis</td>
<td>50</td>
</tr>
<tr>
<td>Predictors of PSE Enrollment</td>
<td>50</td>
</tr>
<tr>
<td>Predictors of PSE Completion and Success</td>
<td>51</td>
</tr>
<tr>
<td>Employment</td>
<td>52</td>
</tr>
<tr>
<td>Social Integration</td>
<td>53</td>
</tr>
<tr>
<td>Summary</td>
<td>54</td>
</tr>
<tr>
<td>Chapter 3 METHODOLOGY</td>
<td>55</td>
</tr>
</tbody>
</table>
Problem statement and purpose………………………………………………………………….55
Hypotheses…………………………………………………………………………………………..50
Rationale for analysis of the National Longitudinal TransitionStudy-2 data………………56
Data source…………………………………………………………………………………………..56
Sampling design……………………………………………………………………………………..57
Data collection methods and instruments……………………………………………………58
  Youth assessment (Direct assessment)…………………………………………………………59
  Parent/Youth phone interview and/or mail survey…………………………………………60
  General education academic teacher surveys………………………………………………61
  School program surveys……………………………………………………………………….61
  Sample…………………………………………………………………………………………….62
Variables……………………………………………………………………………………………64
  Dependent measure (Post-secondary education completion)……………………………65
  Predictor variables……………………………………………………………………………65
    Demographics………………………………………………………………………………….65
    Skills and abilities……………………………………………………………………………66
    Prior schooling………………………………………………………………………………66
    Goals/Intentions……………………………………………………………………………..67
    External commitments……………………………………………………………………..67
    Mediator variables (Institutional experiences associated with social integration)……67
Categorical principal component analysis…………………………………………………68
Descriptive analyses………………………………………………………………………………72
Data analytic plan………………………………………………………………………………….74
List of Tables

1. Comparative Summary of Student Demographic Information ........................................64
2. Component Loadings .................................................................................................66
3. Model Summary ........................................................................................................71
4. Cross-tabulation for Samples and Demographic Variables .......................................73
5. Cross-tabulation for Samples and Independent Variables ........................................73
6. Logistic Regression Analysis for Predictors of Post-secondary Education Completion ....86
7. Regression Analysis for Predictors of Institutional Experiences associated with social integration (path a) ..............................................................88
List of Figures

1. Student integration model (Tinto, 1993) ................................................................. 26
2. Selection criteria for the primary study sample ......................................................... 63
3. Component Loading .................................................................................................. 71
4. Causal Step Approach .............................................................................................. 74
Abstract

Completing College: A Longitudinal Examination of Potential Antecedents of Success in Postsecondary Education for Students with Disabilities.

A dissertation submitted in partial fulfillment of the requirements of the degree of Doctor of Philosophy at Virginia Commonwealth University

By

Edwin Obilo Achola, Ph.D.

Virginia Commonwealth University, 2013

Major Director: Colleen A. Thoma, Ph.D., Professor
Virginia Commonwealth University

The purpose of this study was to determine the antecedent conditions that contribute to post-secondary education (PSE) completion for students with disabilities, taking into account institutional experiences associated with social integration. A prospective longitudinal design was used to analyze data from the National Longitudinal Transition Study-2. The study sample consisted of youth who were currently enrolled in vocational schools, two-year community colleges, and four-year universities six years after high school exit. Logistic regression was used to examine the relationships between pre-entry variables and PSE completion. To test the hypothesis of mediation, the causal step approach (Baron & Kenny, 1986) was used. Findings indicated that self-advocacy, participation in work-study or paid employment, participation in extra-curricular activities, and development of vocational skills as a primary transition goal significantly predicted PSE completion. Students who participated in work-study or paid employment reported higher levels of PSE completion. Students who provided input in IEP
meetings were less likely to report completing PSE compared to peers who took leadership roles in IEP meetings. Both participating in extra-curricular activities and developing vocational skills as a primary transition goal were negatively associated with PSE completion. The mediation analysis revealed that it is unlikely that institutional experiences examined in this study mediate the relationships between pre-entry variables and PSE completion. Findings further showed that many of the factors considered in the student integration model (Tinto, 1975, 1987, 1993) are positively related to PSE completion for students with disabilities.
Chapter 1: Introduction

More students with disabilities are enrolling in higher education than ever before. According to data reported by the U.S. Census Bureau for 2012, students with disabilities account for nearly 11% of the nation’s college students. This figure represents a significant increase as compared with only 2.6% reported in 1978 (NCES, 2003) soon after the passage of the Education for All Handicapped Children Act in 1975. Although students with disabilities continue to enroll in postsecondary education (PSE) at an increasing rate, very few complete their programs (Newman et al., 2011). Moreover, the number of students with disabilities entering and succeeding in PSE remains below that of their peers without disabilities (Williamson, Robertson & Casey, 2010). Data from the National Longitudinal Transition Study-2 (Newman et al., 2011) indicate that completion rates of postsecondary students with disabilities, in general, are significantly lower than those of similar-aged peers (41% vs. 52%). The rates of completion vary by type of PSE setting. Compared with peers in the general population, completion rates for students with disabilities at four-year colleges are lower than their peers (34% vs. 51%). Conversely, students with disabilities in two-year colleges are more likely to complete their programs than students without disabilities (41% vs. 22%). Students with disabilities who attend postsecondary vocational/business, or technical schools are more likely to complete their programs compared to peers with disabilities who enrolled in a four-year PSE programs (57% vs. 34%).

These dismal graduation rates highlight the importance of investigating students’ persistence until graduation. Previous studies have attributed the low graduation rates to numerous challenges including inadequate preparation for college, financial constraints, lack of self-advocacy skills, and low levels of academic and social integration in college (Foster &
DeCaro, 1991; Hodges & Keller, 1999; Newman et al., 2011; Rosenbaum, 2001; Wooseley & Shepler, 2012). Many of the factors that influence PSE completion rates are related to students’ experiences in high school and post-secondary environments. However, limited longitudinal research that accounts for the combined impact of high school and college related factors has been conducted for learners with disabilities. Of particular interest is the potentially mediating role that institutional experiences related to social integration (e.g., participation in extracurricular activities, peer relationships) play on the prediction of PSE completion.

Recent studies examining PSE completion have suggested that institutional experiences associated with social and academic integration such as positive peer relationships, access to accommodations and involvement in college sports contribute to persistence for students with disabilities (DaDeppo, 2009; Mamiseishvili & Koch, 2011; O’Neal, Markward & French, 2012). Moreover, the studies examining PSE outcomes for students with disabilities have focused on the main effects of numerous independent variables (e.g., disability, gender and accommodations) on PSE success outcomes. For example, O’Neal et al. (2012) examined the main effects of student characteristics and support services on the likelihood of graduation and found that females and students 23 years of age and older were more likely to graduate from college compared with males and younger peers. Results from this study also showed that students who qualified for distraction-reduced testing had a higher likelihood of graduation compared to students receiving other accommodations. It is likely that students who qualified for distraction-reduced testing may have matriculated into college with higher grades, hence are more likely to persist until graduation. However, from this study, little can be empirically deduced about the relationship between student background, and support services with respect to PSE completion rates. The current study seeks to identify factors affecting PSE completion and to explore the mechanisms
or processes by which predictors such as high school achievement and high school academic coursework influence program completion for learners with disabilities in PSE.

**Implications of Post-secondary Education Completion**

Research on the benefits of post-secondary education provides some consensus that college completion affords numerous advantages for individuals with and without disabilities. Not only do individuals with a college degree earn more money than their peers with only a high school degree, they lead healthier lifestyles, experience greater job satisfaction, and are more civically engaged (Baum, Ma, & Payea, 2010). According to a recent report by the College Board (Baum et al., 2010) full-time employees with a bachelor's degree earned $55,700 in 2008 as opposed to employees who joined the workforce with a high school diploma and earned only $21,900. Also, the unemployment rate in 2009 for younger adults between the ages of 20 to 24 with high school diplomas was 2.6 times higher than the unemployment rate of their peers with college degrees.

The impact of a college degree on the economic status of individuals with disabilities has also been documented in the literature. Schley, Walter, Weathers II, Hemmeter, Hennessey, and Burkhauser (2010) found that deaf students who graduated from college reported earnings at rates substantially higher than non-graduates. At age 30, approximately 85% of graduates who were deaf (with either bachelor’s or associate’s degrees) reported having earnings from work. For non-graduates, about 75% reported earnings at age 30. By age 50, 74% of bachelor’s and 72% of associate’s degrees graduates reported earnings, whereas only 61% of students who withdrew from college reported earnings. Of those who were admitted but chose not to attend, only 53% were employed at the age of 50. Similarly, other studies indicate that students with an intellectual disability (ID) who participate in PSE have better employment prospects compared to
their peers who do not participate in PSE (Grigal & Dwyre, 2010; Migliore, Butterworth, & Hart, 2009). Grigal and Dwyre (2010) found that students with an intellectual disability (ID) who participate in dual enrollment programs in PSE settings have a relatively high rate of paid employment. In addition, Migliore, et al. (2009) found that youth with ID who participated in PSE were 26% more likely to leave vocational Rehabilitation VR services with a paid job and earned a 73% higher weekly income. Given the potential benefits of PSE completion for students with disabilities, efforts to identify effective means of facilitating successful transition to PSE become more important.

**Legislation Promoting Participation in Postsecondary Education**

In the United States, local and state governments have plenary power to enact statutes concerning education so long as these statutes do not violate the provisions of the United States Constitution. The national government also plays an important role in defining the course of the educational system through legislative precedence intended to address an array of national needs. These national priorities revolve around issues such as civil rights, equity, and the need to turn out enough, adequately trained experts in a wide range of skills essential for the nation’s growth and global competitiveness. To ensure that such priorities filter down to local educational agencies (LEA), Congress ties federal funding to mandates that must be fulfilled by states accepting those monies. In the case of students with disabilities, the national government has shaped the terrain of education through the passage of key pieces of legislation such as the No Child Left Behind Act, 2001 (P.L, 107, 110), the Individuals with Disability Education Improvement act, 2004 (P.L 108, 466), and the Higher Education Opportunity Act 2008 (P. L. 110, 315). These laws have been widely credited for the improved PSE outcomes of student with disabilities.
No Child Left Behind Act, 2001 (P.L, 107-110). The No Child Left Behind Act (NCLB) signed into law in 2002, was a reauthorization of the Elementary and Secondary Education Act, one of the key federal laws defining education for students with disabilities. At the core of NCLB are a number of measures that were intended to address the problem of the widening achievement gap among students and enhance accountability for student progress (U.S. Department of Education, 2001). These measures required that states bring all students up to the proficient level by 2013-2014, submit annual reports, ensure teachers in core content areas are highly qualified, schools use research based strategies, and resources target school districts with high concentrations of children living in poverty (Yell & Drasgow, 2005). The accountability and progress monitoring measures emphasized in the law have had wide ranging implications for students with disabilities especially those who want to go to college. Because of the progress-monitoring requirement, some states mandate passing of statewide assessments as part of graduation requirement for students with disabilities particularly those seeking a standard diploma (Johnson, Thurlow & Stout, 2007). In addition, school districts are expected to meet adequate yearly progress (AYP) measured by the performance of students compared to state standards. While the actual impact of the law remains a subject of debate, supporters of the law have argued that the pressure to meet AYP while including students with disabilities in statewide tests, implicitly raises expectations for students (McLaughlin, Embler, Hernandez, & Caron 2006) and is likely to improve student’s academic outcomes. High expectations and graduation with a standard diploma are likely to promote enrollment in PSE.

Individuals with Disability Education Improvement Act- IDEIA, 2004 (P.L 108-466). Prior to 1975, education for students with disabilities was characterized by student placement in inadequate, segregated classrooms, general education classrooms without
meaningful support, and, at times, total exclusion from the educational system (Taylor, Richards & Brady, 2005). Such experiences spurred a number of court cases that left state governments with the financial burden of responding to the educational needs of students with disabilities. In response, Congress enacted the Education for All Handicapped Children Act, 1975 (P.L. 94-142) that guaranteed funding for free appropriate public education in the least restrictive environment for students with disabilities. This law has been reauthorized several times and it is now the Individuals with Disabilities Education Improvement act, 2004 (P.L 108, 466).

The latest version of IDEA establishes some important precedence that directly impact PSE outcomes for students with disabilities. First, the law requires that students with disabilities participate in state and district wide assessments that are aligned with the general education curriculum. This requirement is an important step towards improving students’ readiness for post-secondary education and in addition, opens up a wide range of career options. The admission requirements of many programs offered at PSE institutions are based on performance in the general education curriculum. For example, many Bachelor of Science in nursing programs require that students do well in biology, chemistry, physics, geometry and high school English in order to be considered for admission. Most degree programs have similar coursework requirements for admission.

Second, the transition-planning component of IDEA requires local education agencies (LEAs) to begin providing transition services to all students with disabilities in the school year during which they turn 16. The transition services primarily prepare students for postsecondary education, employment and independent living. The law conceptualizes transition services as a coordinated set of activities for a child with a disability that are designed to be within a results-oriented process, focused on improving the academic and functional achievement of the child.
with a disability, to facilitate the child’s movement from school to post-school activities, including postsecondary education, vocational education, integrated employment, continuing and adult education, adult services, independent living, or community participation [34 CFR 300.43 (a)] [20 U.S.C. 1401(34)]. Recent research suggests that receiving transition services facilitates improved PSE outcomes of students with disabilities (Neubert & Redd, 2008).

**Higher Education Opportunity Act 2008 (P. L. 110, 315).** The Higher Education Opportunity Act (HEOA) was enacted on 2008, reauthorizing the Higher Education Act (HEA) of 1965. This law was intended to improve access to higher education by minimizing tuition and cost increases at institutions of higher education and offering financial aid to several categories of students. In addition to the financial aid options for institutions serving traditionally marginalized groups of students, the HEOA provided funding to support model demonstration projects and coordinating centers for students with intellectual disabilities in college and addressed the need to provide accessible instructional materials for learners with disabilities in college (Kurz, Scannell, & Veeder, 2008; Madaus, Kowitt & Lalor, 2012). These amendments have been credited with some of the positive PSE outcomes experienced by students with disabilities. For example, students with ID, can now qualify for financial aid provided they meet the stipulated requirements and are enrolled in approved programs. This financial aid can be available throughout the school year; a change that allows part-time students with disabilities to continue with coursework through the summer. The HEOA also expanded the definition of post-secondary education to include a broader range of programs and options, including certificates and apprenticeships (DeWitt, 2010). The inclusion of institutions that do not offer bachelors or associates degrees widens PSE options for students with disabilities as students can still qualify for financial aid to enroll in these college programs. While many of the high school experiences
and services offered to students with disabilities as a result of these laws support their PSE goals, little research has been done to illustrate how these services and experiences contribute to PSE completion (Thoma, Lakin, Carlson, Domzal, & Boyd, 2011)

**Overview of Study**

It is important for researchers to understand the conceptual relationships between potential predictor variables and PSE completion to identify factors affecting PSE completion and explore the mechanisms or processes by which predictors such as high school academic coursework influence PSE completion. The student integration model (Tinto, 1975, 1987, 1993) offers a useful approach to examining PSE success since it accounts for the transition process from high school to college whereas other models focus on PSE experiences alone. This model indicates that pre-entry factors such as skills and experiences related to prior schooling in addition to background characteristics, goals/intentions, and commitments, affect how students interact with the social and academic systems of colleges. Consequently, students’ experiences with the social and academic systems influence their commitment to the goal of completion and to the institution of choice hence, the decision to persist. Thus, PSE experiences mediate the relationship between pre-entry factors and PSE completion. This study is built upon the understanding that there exists a longitudinal causal sequence among factors associated with PSE success for students with disabilities. Therefore, pre-entry factors (e.g., family background, and prior schooling) are assumed to influence institutional experiences; institutional experiences in turn lead to persistence (Tinto, 1987,1993). This study will use data from the NLTS-2 to investigate the factors that contribute to persistence until graduation for students with disabilities.
Statement of Problem

Many students with disabilities who endeavor to earn a college degree fail to persist until graduation. In studying the complexities of PSE success for students with disabilities, many studies focus on describing the main effects of a variety of variables (e.g., high school grades, gender, transition goals) on PSE outcomes such as enrollment, intent to persist, persistence from first to second year, integration, and PSE completion; however, few studies have identified and explicated the processes that underlie the observed relationships between the independent variables and outcome variables that constitute success in PSE. For example, Wessel, Jones, Markle and Westfall, (2009) found that students with disabilities who enrolled in college with higher SAT scores took a shorter period to graduate compared with peers who had lower SAT scores. Wessel et al. hypothesized a direct causal relationship between SAT scores and length of time to graduation. However, there could be a number of reasons why that relationship exists that are as yet explored. It is likely that students with higher SAT scores come into PSE with credits earned towards their degrees through dual enrollment and/or advance placement courses while still in high school. Those students may have more time for peer relationships, and possibly more informal contacts with faculty. In this case, the potential mediator variables (peer relationships, informal contacts with faculty) serve to clarify the nature of the relationship between SAT scores and length of time it takes to graduate. Current research suggests that institutional experiences related to social integration (e.g., peer relationships) predict college success (DaDeppo, 2009). Studies that focus on the main effects of independent variables such as SAT scores do not account for the potentially mediating effect of institutional experiences on the relationship between predictors and PSE outcomes. Berger & Milem (1999) suggest that specification of both direct and indirect effects provides a more complete picture of how different factors affect each
other. Therefore, it is important to determine the predictors of college completion while accounting for the influence of institutional experiences through mediation analysis.

**Conceptual Framework**

**Student integration model.** Several theoretical models have been advanced to account for student retention in PSE. Most of these theories, however, have neither been very effective nor particularly well suited for the needs of institutional officials who seek to retain more students on campus (Tinto, 1993). Attempts to bring clarity to the understanding of the influence of factors affecting student retention should be well grounded in theory. Bean (1981) asserted that theory guides research and prevents the analysis of variables which show little potential for explaining attrition. Tinto’s (1975, 1987, 1993) longitudinal model of institutional departure is the most cited theoretical framework explaining the student retention process (Khan & Nauta, 2001; Kuh et al., 2006; Townsend & Wilson, 2009). The student integration model (Tinto, 1975, 1987, 1993) proposes a longitudinal causal sequence among factors that influence persistence and completion of PSE.

Tinto (1993) postulated that students bring to college a set of pre-entry traits (e.g., demographic, secondary school experiences, and achievement), goals, and commitments that influence their initial levels of commitment to the institution of attendance and to the goal of college graduation. These pre-entry attributes interact over time with institutional experiences (academic and social) to influence the level of academic and social integration experienced by the individual. The interaction of several factors leads to a re-examination of their goals and intentions and hence decisions whether to leave or continue in a program. Many researchers have offered criticisms of the student integration theory particularly regarding its utility with diverse student populations (Hicks & Lerer, 2003; Braxton, Hirschy & McClendon, 2004). It is for this
reason that some scholars have pointed out the need to add a cultural component to the model to better understand the differences in persistence behavior of students of color and the overall change in the characteristics of students presently in PSE (Hurtado & Carter, 1997; Kuh & Love, 2000). One plausible approach to accounting for diversity among students may involve examining the languages spoken at home as a demographic variable.

Concerns have also been raised as to whether Tinto’s (1975, 1987) model can be effective in explaining student outcomes in non-residential colleges. Such colleges may offer different opportunities for social and academic integration compared to those available to students in residential settings. Tinto (1993) admitted that, in addition to factors acknowledged above, external forces and external choices such as actions of one’s family and members of one’s community can play an important part in the decisions of individuals to depart no-residential colleges. Similarly, Braxton, Hirschy and McClendon (2004) found a lack of empirical backing for the influence of academic integration in residential universities. They suggested revisions to Tinto’s model, including dropping academic integration from the model and expanding the repertoire of factors that influence social integration for residential students. Tinto (1975) and Stage (1989) also noted that one form of integration can act as a medium for the other form of integration, with high levels of social integration compensating for weaker academic integration.

Purpose of Study

The purpose of this study was to determine which antecedent conditions (e.g., pre-entry attributes, goals, and commitments) contribute to PSE completion for students with disabilities, taking into account institutional experiences associated with social integration. This study draws upon mediation analysis to explore the relationships between pre-entry factors, variables associated with social integration, and PSE completion. Most quantitative research on PSE
success for students with disabilities focuses on relations between two variables, $X$ and $Y$; where $X$ is the independent variable and $Y$, the outcome measure. Mediation in its simplest form represents the addition of a third variable ($M$) to this $X \rightarrow Y$ relation, whereby $X$ causes the mediator, $M$, and $M$ causes $Y$, so $X \rightarrow M \rightarrow Y$. In this study $X$, $M$, and $Y$ represent pre-entry, institutional experiences and PSE completion respectively. The student integration model (Tinto 1975, 1987, 1993) considers institutional experiences (e.g., social integration, college academic success) as mediating the relationship between pre-entry variables and PSE completion.

**Rationale and Significance of Study**

A great deal of literature has focused on the process of transition to PSE for students with disabilities. Many of these studies have examined predictors of enrollment in PSE (Chiang, Cheung, Hickson, Xiang, & Tsai, 2012; Halpern, Yovanoff, & Benz, 1995), PSE academic achievement (DaDeppo, 2009; Kaminski, Turnock, Rosen & Laster, 2006), graduation (O’Neal et al., 2012; Troiano, Liefield & Trachtenberg, 2010), persistence and retention (Mamiseishvili & Koch, 2011; Wessel, Jones, Markle, Westfal, 2009), as well as integration in college (Woosley & Shepler, 2012). The literature abounds with studies of predictors of PSE outcomes, but little is written about why some students with disabilities succeed at completion (Madaus, 2006). The studies listed above focus on the main effects of predictor variables on PSE outcomes. However, the relationships between factors associated with PSE success (e.g., gender, age, SAT scores), and outcomes such as program completion may be more complex beyond simple bivariate correlations. Rather, these relationships are modified by, or informed by the addition of mediators, moderators, suppressors, and confounders (MacKinnon et al., 2000). To advance college success theory, research, and practice, it is important to move beyond the examination of main effects. One way to do this is by examining mediators of these effects (Frazier, Tix &
Barron, 2004). Drawing upon the student integration theoretical framework (Tinto, 1975, 1987, 1993), this study will explore the relationships between pre-enrollment factors, post school goals, external commitments, PSE experiences and program completion. Determining the relationships between these variables and program completion represents an important step towards the development of effective transition curriculum that aligns the K-12 system with the expectations of colleges and universities.

**Research Background**

This section will discuss the direct effects of pre-entry factors as well as factors associated with the academic and social systems of colleges on the likelihood of PSE completion.

**Pre-entry variables.** Tinto’s (1987, 1993) longitudinal causal model suggests that pre-entry attributes such as family background, skills and abilities, and prior schooling constitute the financial, social, and intellectual resources, which individuals bring with them into college. These attributes and dispositions at entry influence PSE outcomes such as social and academic integration as well as persistence. A few studies have examined the main effects of pre-entry variables on the likelihood of PSE completion for different groups of students with disabilities. For example, Wessel et al. (2009) found that gender, SAT quantitative scores, high school performance, and disability category were all statistically significant predictors of college graduation. Males and students with low SAT quantitative scores had greater risk of an attrition event. Similarly, Richardson (2009) found that among college students with disabilities in the United Kingdom, gender, entry qualifications and age significantly predicted the likelihood of obtaining a good degree (first class honors and second class upper division). Richardson found that older students, females, and students with higher entry qualifications were more likely to
obtain good degrees. These conclusions are consistent with findings in recent studies (such as O’Neal, et al., 2012) which found that among students with disabilities who received services from the accessible support centers, females and students 23 years of age and older were more likely to graduate than their male and younger counterparts, respectively. O’Neal et al. also found that students with physical disabilities were more likely to graduate than students with cognitive or mental disabilities.

Current research suggests that the type of setting in which students receive instruction affect the likelihood of enrollment and completion of PSE programs. Lombardy, Doren, Gau, and Lindstorm (2012) used the NLTS-2 data to examine the influence of instructional setting in reading and math on post-secondary participation for secondary students with disabilities. The results from this study indicated that both students who received English/language arts and students who received math instruction in a general education classroom were two times more likely to be enrolled or graduate from a two-year institution compared with peers who received English/language arts or math instruction in a non-general education classroom. This study also showed that students who received math instruction in a general education classroom were two times more likely to be enrolled or graduated from a four-year college compared with those who received math instruction in a non-general education classroom. This study however, used a combined outcome variable, which included students who either enrolled in and/or graduated from two- and four-year institutions. As such the outcome of enrollment was treated as equivalent to graduation.

A variety of skills and attitudes that learners with disabilities bring into the college setting have also been associated with PSE completion. Barber (2012) found that students with disabilities who had graduated from college had observable personal qualities (self-awareness,
perseverance and interpersonal skills) that allowed them to develop and maintain positive, long-term relationships with mentors, either on-campus or in their social circles. The successful students’ insight about their disabilities and ability to self-advocate were universally high.

**Post-secondary education academic systems.** Post-secondary institutions of higher learning are composed of academic and social systems, both of which contribute to college success (Tinto, 1993). Academic systems are generally centered on issues related to formal education of students, such as courses offered and academic support. In this regard, academic systems involve faculty and staff whose primary responsibility is to educate students (Tinto, 1987). Hence, students who successfully engage with faculty and staff in the process of learning may be considered academically integrated. Many studies have documented the influence of institutional experiences associated with PSE academic systems, particularly the use of accommodations on PSE completion for students with disabilities. For example, Skinner (1999) found that course substitutions, particularly substitutions for foreign language requirements, contributed positively to higher graduation rates of students with disabilities. O’Neal, et al. (2012) also found that, among students with disabilities who qualified for accommodations in college, the odds of graduation were best for those who qualified for distraction-reduced testing and students who received assistance with learning strategies/study skills. Similarly, Troiano (2010) also found that students who consistently attended academic support center appointments had higher rates of success than those who did not attend or who did not attend consistently.

**Post-secondary education social systems.** The post-secondary education social system is characterized by the sets of interactions among students and other PSE personnel that take place largely outside the formal academic domain of the institution (Tinto 1993). These interactions reflect the degree of congruency between a student and the social system of a college
or university typically measured by the quality of peer-to-peer interactions (Kuh, Kinzie, Buckley, Bridges, & Hayek, 2006). Evidence suggests that engagement with the college social system significantly contributes to PSE completion. For example, Barber (2012) indicated that students with disabilities who completed college reported using many services on campus and attributed their success to a significant relationship with either a professional staff member at the Office of Special Services or a faculty member. Skinner (2004) also noted that students with disabilities who had graduated from college emphasized the importance of support from family, friends, instructors, and/or academic support personnel to their success in college. Even though the social and academic systems are connected (Tinto 1993), experiences in each may lead to varying modes of persistence. For instance, compared to academic integration, social integration plays a larger role in the prediction of intent to persist for students with learning disabilities in college (DaDeppo, 2009).

In sum, evidence supports the relationship between the factors addressed above and PSE completion. However, many of the conclusions presented across and within studies require further clarification. For instance, while Ofiesh, (2000) and Weaver, (2000) found that test accommodations such as giving students extra time to take exams, positively influenced the test scores of students with disabilities; improved test scores may have a limited influence on PSE completion. O’Neal et al. (2012) found that providing students with extra-time does not significantly contribute to PSE completion. Hence, mediation analysis may be appropriate in clarifying the relationships between the identified predictors and PSE completion. The mediation model offers an explanation for how, or why, two variables are related (e.g., gender and graduation) where an intervening or mediating variable (e.g. PSE accommodation) is
hypothesized to be intermediate in the relation between an independent variable and an outcome measure.

By and large, the studies examining PSE completion have identified pre-entry factors such as demographics (disability, gender, and age), SAT quantitative scores, high school academic performance, and self-determination as predictive of PSE completion. In addition, other pre-entry factors such as post-school goals, high school academic courses, and participation in extra-curricular activities have been associated with PSE outcomes (Daviso, Denney, Baer, and Flexer, 2011; Halpern. et al., 1995; Rojewsky, 1999). To date, only the main effects of these factors have been described. Of interest to this study is the potentially mediating role that institutional experiences related to social integration play on the relationship between the pre-entry variables and PSE completion. Hence, a mediation model approach will be used to examine the direct and indirect effects of pre-entry variables by including institutional experiences related to social integration. Given the relationships between pre-entry factors and PSE completion, the present study will assess: (1) How, high school achievement, self-determination, post-school goals, participation in employment, high school academic courses, participation in extra-curricular activities are associated with post-secondary education completion; and (2) Whether institutional experiences associated with social integration mediate the relationship between pre-entry factors and PSE completion.

Hypotheses

The study hypotheses for this study were as follows:

Hypothesis 1: Pre-entry variables (high school achievement, self-advocacy, post-school goals, high school academic courses, participation in extra-curricular activities, and participation in employment) predict PSE completion; and
Hypothesis 2: Holding demographic factors constant, the relationships between the pre-entry variables and PSE completion will be mediated by institutional experiences associated with social integration

Research Design

A prospective longitudinal design (Collins, 2006) was used to examine the influence of factors reflective of students’ experiences before college on PSE completion. Specifically, this study examined the antecedent conditions (e.g., pre-entry attributes, goals, and commitments) that contribute to PSE completion for students with disabilities, taking into account the intervening role of institutional experiences associated with social integration. The prospective longitudinal design has been used in prior studies to investigate predictors of PSE outcomes such as enrollment and persistence (Chiang et al., 2012; Wessel et al., 2009)

Instruments. This investigation involved a secondary data analysis of the NLTS-2 data (NLTS-2, 2009) primarily drawn from waves one to five that are currently available from the Institute of Educational Sciences (IES). The NLTS-2 was a study funded by the US Department of Education, documenting the experiences of a national sample of students receiving special education who were 13 to 16 years of age in the year 2000. This 10-year research effort involved three main data collection components: parent/youth telephone interviews, direct assessments, and in-person interviews. School data were obtained over five waves of data collection from 2001 to 2009. (Cameto, Wagner, Newman, Blackorby, & Javitz, 2000). Data used in this study were obtained from the parent survey, parent/youth survey, school program survey, and program surveys. These sources of data provided information on youth and family characteristics, non-school activities, and activities after high school as well as students’ school program and academic performance.
Summary

This study used Tinto’s (1975, 1987, 1993) student integration model to explore the antecedent conditions that contribute to PSE completion. Tinto suggested that pre-entry experiences, post school goals, and commitments determine the likelihood of students’ success in engaging with the academic and social systems of colleges. Consequently, the level of engagement in college influence departure decisions. Students who have failed to successfully integrate either academically or socially into the new setting have an increased risk of exiting college prematurely. Chapter 2 discusses the studies that have examined predictors of PSE success outcomes such as enrollment, persistence, academic success, and social integration.
Chapter 2

The purpose of this review was to provide an overview of the current literature on social integration and pre-entry factors associated with PSE success outcomes such as enrollment, college academic success, and persistence. Previous research has shown that social integration significantly contributes to persistence above and beyond background characteristics and academic integration for students with disabilities (DaDeppo, 2009). Similarly, the selected PSE success outcomes (e.g., college academic success, persistence) potentially influence the relationships between pre-entry independent variables and PSE completion. While there are a number of PSE success factors that may influence the relationships between pre-entry factors and PSE completion, institutional experiences associated with social integration was the focus of this study.

This chapter is organized into three sections. The first section reviews Tinto’s (1975, 1987, 1993) student integration model, which provides the conceptual framework for this study. The second section discusses pre-entry factors associated with PSE outcomes. The third section provides a review of literature on social integration. This review involved a systematic search of three databases: Educational Resources Information Clearinghouse (ERIC), Education Research Complete, and PsycINFO. This search was limited to peer reviewed publications. The key descriptors used on all the databases included college success, college readiness, disabilities, predictors, persistence, retention, attrition, graduation, integration, enrollment, post-secondary education, college experience, post-secondary goals, employment, integration, vocational education, community college and higher education. Various combinations of at least two
descriptors at a time (e.g., disabilities and persistence and integration) were entered to capture relevant publications. This exercise yielded a total of 218 articles. In addition, an examination of the references of the selected articles and a hand search of six major journals (Journal of Post-secondary Education and Disability, Exceptional Children, Research in Higher Education, Career Development and Transition for Exceptional Individuals, Journal of Vocational Rehabilitation & Journal of College Student Retention) was conducted yielding an additional 26 articles. The hand search focused on publications within the last three years. A total of 242 articles were screened for possible inclusion. Studies were selected based on whether they were empirical, examined students who had enrolled in post-secondary education (4 year colleges, 2 year colleges and vocational programs) at any point, clearly distinguished participants with disabilities, and investigated some index of success in college. A total of 40 articles met the selection criteria.

**Tinto’s Student Integration Model**

Tinto’s (1975, 1987, 1993) student integration model postulates that the individual departure process involves three distinct stages: separation from the communities of the past, transition between high school and college, and incorporation into the society of the college. Tinto (1993) asserted that individuals must first disassociate themselves, in varying degrees, from membership in communities of the past (family, friends in high school), a process that facilitates the adoption of behaviors and norms appropriate to the college environment. For some students, the disassociation process may be so difficult it interferes with persistence in college. This may be especially true for students who choose to attend college away from their local neighborhoods. However, students who attend local non-residential colleges may not necessarily need to disassociate from past affiliations to successfully establish membership in the newly met
communities in college. Such students tend to live at home or close to home and, therefore, are likely to have much more contact with family as opposed to students who live far away from home. Tinto (1987, 1993) explained that the transition process, in large part, depends on the level of congruence between the norms and patterns of behavior that characterizes a student’s family background and those encountered in college. In this regard, students who come from families whose norms and patterns of behavior are very different from the norms required for membership in college communities may face difficulty integrating into the new system even when they had been successful in previous educational settings. The student integration model also acknowledges that the scope of the transition process in influenced by a learner’s level of readiness prior to entry. Tinto (1993) asserted that individuals would sometimes anticipate their socialization by moving towards perceived institutional goals prior to actual admission.

The desire to fit in moves them to emulate the life of the institution by getting ready well in advance of entry…In any case, it is doubtful that individuals’ prior understanding of the life of colleges is so accurate as to anticipate the character of transition they will have to make (Tinto, 1993, p 97-98).

The student integration model hypothesizes that students are more likely to drop out during their first year of college as a result of the stresses that the transition process induces rather than the problems associated with social and academic integration. After passing through the separation and transition phases, an individual is faced with the task of integrating into the social and academic systems of the college.

Tinto (1993) suggested it is important to distinguish between the varying forms of intellectual and social integration as the experiences of a person in each system may have separate effects upon his or her departure from the institution. Thus, individuals may perform
adequately in the academic domain of the college and still depart due to inability to integrate into the social system of the institution. Conversely, a student may establish competent membership in the social systems, largely comprised of peers, and still drop out due to inadequate performance in the academic domain. Membership in the academic domain (academic integration) entails behaviors that students can engage in that contribute to their intellectual development (Tinto, 1987). These activities may include meeting with faculty and advisors, using the library, and attending out-of-class academic activities. Social integration, on the other hand, entails behaviors related to social involvement that include meeting other students, making friends, and participating in extra-curricular activities including social and cultural events on campus (Tinto, 1987). Though experiences in the academic and social systems may have distinct impacts upon persistence, the two are interdependent and interactive. Experiences in the formal social system, for instance participation in work-study, may have important effects upon one’s success in the academic system of the college (Tinto, 1993). Moreover, students’ interactions and experiences with individuals outside of the college milieu also contribute to the process of persistence.

Events that occur as a result of the involvement of a student’s family and community may play an important part in the decisions of individuals to depart college. Tinto (1987, 1993) asserted that this may be especially true in non-residential colleges particularly in urban settings and among working students, where full time participation in social and academic activities on campus may not be possible. For students attending college in such settings, going to college is but one of the numerous obligations they have to meet in the course of a typical day. Such external demands (external commitments) may curtail students’ efforts to accomplish college related goals. For example, students who work full time and have parenting obligations may need
to divide their time to meet the demands of each of these obligations, hence limiting time available for college commitments. However, even when external factors favor college success (e.g., favorable external commitments, adequate preparation for transition), the decision to persist until graduation may be contingent upon an individual’s disposition.

Tinto (1993) posited that certain personal dispositions incline individuals towards departure or persistence. These dispositions as defined in the student integration model (Tinto, 1987, 1993) are divided into two categories: expectations and motivations. Individuals who are highly motivated and have expectations of college completion tend to have a higher likelihood of persistence and completion as opposed to peers who are less motivated and hold lower expectations of college completion. Tinto (1987) proposed that these expectations and motivations can be best measured by goals/intentions and commitments. Goals/intentions specify valued plans towards which activities are directed. Commitment relates to a student’s eagerness to attain the stated goals both in education in general and within the context of the institution of choice. Therefore, it is necessary to draw a distinction between students’ commitment to the goal of completion and their commitment to staying at the institution of choice. In sum, Tinto’s (1975, 1987, 1993) longitudinal model of student departure from institutions of higher education takes into account pre-entry attributes (e.g., family background, skills and abilities, and prior schooling), goals and commitments, as well as institutional experiences leading up to departure decision. The current study will focus on factors associated with the transition process, particularly, pre-entry attributes, goals, and commitments. Many of the pre-entry attributes, goals, and commitments represent the social, financial, and intellectual resources that students bring with them to college. These resources in addition to the transition experience shape how students engage with the academic and social systems after matriculation. Moreover, Tinto
(1993) indicated that, compared to institutional experiences, the transition process contributed more to the departure decision especially for students within their first year of college. Hence, by focusing on institutional experiences and factors associated with the transition process, an in-depth assessment of the contribution of transition planning and external factors to persistence may be conducted. Figure 1 represents the student integration model (Tinto, 1975, 1987, 1993).
Pre-entry Factors Affecting Post-secondary Education Success

**Family background and student characteristics.** The search process yielded four articles that focused on the effect of a number of demographic variables, (Chiang, Cheung, Hickson, Xiang, & Tsai, 2012; Kaminski, Turnock, Rosen & Laster, 2006; Halpern, Yovanoff, &
Benz, 1995; Unger, Pardee, & Shafer, 2000). Two articles focused on PSE enrollment as the outcome measure (Chiang et al., 2012; Halpern et al., 1995). Kamiski et al. (2006) examined academic success among college students with attention disorders while Unger et al. (2000) focused on PSE completion. Even though the majority of these studies supported the influence of family background and student characteristics, mixed findings still abound in this body of research.

Chiang et al. (2012) conducted a secondary analysis of the NLTS-2 data to determine the predictors of PSE participation for students with disabilities. This study examined data reflecting the experiences of approximately 830 secondary school students (ages 13 through 16) whose primary disability was autism. The data used in this study included NLTS-2 wave one to wave four parent/youth phone interview and/or mail survey data and wave one to wave two school program survey data. Results of this study indicated that being in a high-income household (i.e., earning $50,000 or more) was a significant predictor of participation in post-secondary education compared to those in a low ($25,000) income household. When compared with high household income students, the predicted probability of participation in post-secondary education for low household income students is decreased 77%, holding all other variables constant. In addition, independent significant predictors of participation in post-secondary education included annual household income, parental expectation, high school’s primary post-high school goal for the student, high school type, and academic performance.

Kaminski et al. (2006) conducted a study with 84 college students who had previously been diagnosed with attention deficit hyperactivity disorder (ADHD) at a selective liberal arts college in the eastern United States. The purpose of this study was to identify factors associated with PSE academic success. The measures used in this study included the Adult Behavior Rating
Scale-Self Report of Current Behavior (ABRS-IV-Self; Barkley & Murphy, 1998), Psychiatric Symptomatology Symptom Checklist-90-R (SCL-90-R; Derogatis, 1994b), and The Coping Resources Inventory for Stress (CRIS; Matheny, Curlette, Aycock, Pugh, & Taylor, 1987). Each participant's cumulative grade point average (GPA) was used to determine academic success. Results of this study showed that only maternal education differed across success groups (students with high GPA and those with low GPA). Mothers of students with high GPAs (47%) were more likely than mothers of students with low GPA (12%) to have earned a graduate degree ($\chi^2 = 10.43, p < .01$). In contrast, students with low GPAs reported better coping than did students with high GPAs. In addition, the most commonly described coping methods mentioned were working harder and longer than other students (78%) and using some type of social support (52%).

Halpern et al. (1995) conducted a three-year longitudinal study with students identified with a range of disabilities from Oregon ($n= 315$), Nevada ($n= 105$) and Arizona ($n=565$). This study intended to determine predictors of participation in PSE. The researchers developed five data-collection instruments, three of which addressed the in-school components of a broad conceptual model of transition, and two instruments addressed the "post-school" components of the model. The in-school instruments included a student interview, a parent interview, and a teacher questionnaire. The post-school instruments included a student interview and a parent interview. All the questionnaires and telephone interview protocols used in this study reflected a conceptual model of transition that included student and family characteristics, school services received, and quality of life in school. Results indicated that parent perception that the student no longer needed help in certain critical skill areas, parent satisfaction with instruction received by student, student satisfaction with instruction received, and participating in transition planning
were significant predictors of participation in PSE. However, of the nine variables that did not predict participation in PSE, four were demographic (student gender, student ethnicity, family income, and primary disability category).

Similarly, Unger, Pardee and Shafer (2000) examined 124 students enrolled in a mental health program in Quincy, MA, a community college program at the College of San Mateo, CA, and a clubhouse program in Stamford, CT. The objectives of this study were to examine course and college completion for individuals with psychiatric disorders, to determine whether returning to school enhances quality of life and self-esteem, and to see if participating in supported education programs leads to career employment or employment that reflects education level. Results showed that background characteristics such as gender and race were not significantly correlated with PSE success among students with psychiatric disabilities (e.g., personality disorder, depression, bipolar disorder). Results of this study showed that only the number of previous psychiatric hospitalizations and mode of transportation were found to be significantly correlated with PSE completion. Results from this survey also indicated that grade point average prior to study participation, medication utilization, type of institution attended, prior college experience, and number of jobs pre-diagnosis were not correlated with PSE completion rates. In addition this study found that most students (71%) reported being able to perform their jobs better because of their education and 50% reported that their job fit their education level.

**Skills and Abilities**

Tinto (1993) indicated that individuals enter institutions of higher education with a range of skills and dispositions (both intellectual and social) that impact PSE outcomes. Key among these skills for students with disabilities is self-determination/self-advocacy. Self-advocacy is considered an important skill that facilitates self-determination (Sowers & Powers, 1995;
Wehmeyer & Schwartz, 1997). Three of the articles that met criteria for inclusion addressed the impact of self determination/self-advocacy on PSE outcomes such as completion and college GPA (Barber, 2012; Jameson, 2007; Getzel & Thoma, 2008).

Barber (2012) documented the factors that are associated with student success in PSE. Twenty college students were interviewed from three community colleges and two universities in New Jersey. The study participants’ self-described disabilities included a wide range of physical, emotional, and cognitive disabilities as well as dual diagnoses. Colleges were asked to select for interviews only students with disabilities who had successfully completed a degree or were about to complete a degree at the end of the current semester. Accessible Support Services professional staff identified completers who received accommodations while they were enrolled at their college. Each participant took part in a one-hour, in-person interview with the investigator. An interview guide was used for the semi-structured interviews. In addition, the perspectives of key college professionals at the Office of Accessible Support Services were elicited through site visits, phone conversations, and a roundtable discussion. Findings from this study indicated that a common thread among successful students with disabilities was an ability to advocate for the accommodations needed to successfully engage in their education. The investigator noted that participants’ insight about their disabilities and ability to self-advocate was universally high. Furthermore, the study participants had observable personal qualities (i.e., self-awareness, perseverance, focus, and interpersonal skills) that allowed them to pursue, develop, and maintain positive, long-term relationships with mentors, either on campus or within their natural social circle (such as family, friends, and professionals).

Jameson (2007) used a mixed method research design to investigate the link between success outcomes (e.g., retention, college GPA, and graduation) and self-determination for
students with disabilities attending two-year colleges. In this study, the Arc Self-Determination Scale (Wehmeyer & Kelchner, 1995) was used to measure self-determination skills. The majority of the respondents were white \((n = 44)\), female \((n = 34)\), between the ages of 20-24 \((n = 28)\), and single without children \((n = 38)\). In this sample, learning disability (LD) was the most commonly reported disability. The results of this study indicated that participants who had low GPAs registered low mean self-determination score (86) while the participants with high GPAs registered a comparatively high mean self-determination score (110). Similarly, students who had no retention success (not currently enrolled) registered a lower mean self-determination score of 90, while the students with retention success (still enrolled) had a higher mean self-determination score of 110. In addition, findings from this study suggested that students who were identified as having low self-determination (based on the Arc Self-Determination Scale; Wehmeyer & Kelchner, 1995) described their post-secondary experiences negatively as opposed to peers with higher self-determination scores who described more positive post-secondary experiences.

Getzel and Thoma (2008) conducted a study with 34 students with disabilities who were receiving supports and services related to their disability and had been identified as having self-determination skills by staff to determine factors that contributed to their success in PSE. This study used a semi-structured interview process within a focus group format to gather information from students in two- and four-year colleges. Focus group participants identified self-determination as important to their success in post-secondary education. Many shared experiences of not advocating for services, failing, and then choosing to disclose their disability and requesting the supports they needed. In response to questions about self-advocacy skills they believed were essential for staying in college and obtaining needed supports, participants
identified four major themes: (a) seeking services from the accessible support center and college services available to all students; (b) forming relationships with professors and instructors; (c) developing support systems on campus with friends, support groups, and the accessible support center; and (d) gaining a self-awareness and understanding of themselves to persevere.

Participants indicated that scheduling meetings with professors and instructors on a regular basis was helpful in solving issues that arose in class. These meetings were also noted as useful in helping the faculty get a better understanding of what the students needed in terms of support in the class.

High School Experiences

Seven articles that met criteria for inclusion considered a variety of factors associated with high school experiences such as achievement, high school academic courses, and participation in extra-curricular activities (Blackorby & Wagner, 1996; Fleming & Fairweather, 2012; Halpern et al., 1995; Rojesky, 1999; Wagner et al., 1993; Williamson, Robertson, & Casey, 2010). All of these studies focused on identifying factors that contribute to PSE enrollment for students with disabilities. Fleming and Fairweather (2012) used data from the NLTS-2 to develop a model that portrayed the path from high school to post-secondary education that included both disability-related (disability status, severity of disability, satisfaction with special education services, number of special education services) and traditional predictors of high school graduation such as parental education, ethnicity and income. This study focused on the 5,570 respondents who participated in the wave three student/parent interviews, particularly students who had graduated from high school, earned a GED, or were old enough to have left high school for a different reason (n = 3,100). The sample was 31% female and 69% male. Students from racial and ethnic minority groups represented 30% of the sample whereas
70% were white. The main effects of the focal variables were examined using a series of logistic regression models. Results from this study indicated that high school grades and high school graduation were both significant predictors of attendance of four-year institutions. In addition, the transition to a four-year college was more strongly influenced by traditional predictors of college enrollment such as parental education, ethnicity and income (change in $R^2 = .175$) than by disability-related factors (change in $R^2 = .073$). Compared to traditional predictors of PSE enrollment (change in $R^2 = .060$), disability-related factors had a larger influence on vocational–technical education participation (change in $R^2 = .099$). Students with the most severe disabilities were significantly less likely to attend a four-year institution. Severity of disability was the only significant predictor among the disability-related measures for attendance at vocational-technical schools. Students with visual impairments and ED were less likely to attend vocational–technical institutions while students with other health impairments were more likely to attend. In contrast, membership in a minority ethnic group had a significant negative relationship with college attendance, while higher socioeconomic status was positively associated with attending a four-year institution.

Rojewsky (1999) used data from the National Educational Longitudinal Study (NELS) to compare the aspirations and attainment of individuals with and without LD two years after high school completion. This sample consisted of 11,178 participants who included 441 youth with learning disabilities and 10,737 without LD. The participants were between 19 and 21 years of age. The results of this research showed that the general profile of individuals who enrolled in post-secondary education regardless of disability status consisted of high academic achievement, graduation from high school in a college prep or academic program, high-prestige occupational aspirations, high socio-economic status, and positive self-esteem. High school education
aspirations and successful completion of an academic or college prep high school program were the most important variables for individuals primarily enrolled in PSE regardless of disability status. Furthermore, individuals with LD were less likely to be enrolled in some type of PSE and more likely to aspire to moderate and low prestige occupation compared to peers without disabilities.

Miller, Rzonca, and Snider (2000) conducted a study to identify variables related to types of post-secondary experiences chosen by 225 students with learning disabilities. The participants enrolled in five PSE opportunities; (a) junior college ($n = 27$) (b) community college ($n = 109$), (c) four-year college ($n = 14$), (d) military ($n = 42$), and (e) private training programs ($n = 33$). Data analyzed in this study were drawn from the Iowa statewide follow-up survey conducted by the Iowa State Department of Education approximately a year after participants had exited high school. The focal variables examined in this study included participation in extra-curricular activities in school, competitive employment status, financial autonomy, peer influence, gender, academic achievement in reading and mathematics, community resources and mobility, IQ, restrictiveness of the high school special education program, and high school vocational education. Findings from this study showed that students who enrolled in military colleges compared to all the other groups were significantly more likely to have participated in Industrial Arts and Trades and Industry while in high school. In addition, significant differences were also found between the gender of group participants, and participation in different educational experiences. Private training programs and community colleges were found to have a significantly higher enrollment of females compared to military colleges. The majority of students who enrolled in the military were male (40 out of 42). Overall, enrollment in junior college was found to have as significantly larger representation of females students as compared
to military, four-year and community college.

Blackorby and Wagner (1996) analyzed data from the NLTS to determine the post-secondary outcomes of students who had received special education services in high school. The sample included in this study consisted of youth with disabilities who had been out of high school from three to five years. Results suggested that participation in higher-level academic classes in high school (i.e. advanced math or foreign language) related positively to enrollment in PSE programs. Among students with disabilities overall, those who took advanced academic classes in high school were 22% more likely to have enrolled in post-secondary academic programs than peers who did not take advanced academic courses, other factors held constant. The relationship between academic courses and PSE enrollment was strongest for youths with mild and physical disabilities. However, a weaker relationship was noted for youth with sensory impairments (e.g., blindness, deaf) and the relationship for youth with significant support needs was not statistically significant. Similarly, youths who had college preparatory programs in high school were less likely than others to enroll in post-secondary vocational programs. Halpern et al. (1995) also found that completing instruction in traditional content classes, specialized vocational education, and regular vocational education, significantly increased the odds of enrolling in post-secondary education.

Williamson, Robertson and Casey (2010) examined data on 40 students who were reported to have graduated with a high school diploma and had received services under IDEA during the last year of their enrollment. This study sought to examine correlations between the student and/or education subsystems and employment/post-secondary education participation six months following graduation from high school. The majority \((n = 33)\) of participants had received services under a specific learning disability. Data were obtained from a variety of
sources including the student’s summary of performance document, a portion of the student’s psychological assessment data, and a pre-vocational skills checklist (PVSC). This checklist was a document unique to the district under study, and it employed a Likert-type scale. The areas measured by the instrument included scores for classroom performance, timing behavior (e.g., punctuality and attendance), personal care, independent living, cooperation, and self-help (e.g., independently follows directions, asks appropriate questions, uses basic self-help academic skills) as rated by the teacher. In addition, the researchers made follow-up phone calls approximately six months following each student’s graduation from high school. Results indicated that variables related to personal care and independent living were significantly correlated to the outcome of post-secondary education participation. However, none of the variables related to classroom performance, cooperation, and self-help mean scores collectively or separately, were statistically significant in the prediction of PSE enrollment within six months following graduation.

**Goals/Intentions**

Five of the articles that met the inclusion criteria explored post-school transition goals for students with disabilities (Chiang et al., 2012; Daviso, Denney, Baer & Flexer, 2011; Grigal, & Migliore, 2011; Cameto, Levine, & Wagner, 2004; Weiss, Hutchins & Meece, 2012). Data from the NLTS-2 indicate that students with disabilities have a constellation of goals that reflect both their future plans and their schooling experience. Cameto, Levine, and Wagner (2004) found that about half of students with disabilities overall plan to go to college. Consequently, students’ transition goals mainly emphasized PSE and employment, and the transition planning process appropriately reflected those emphases (Cameto et al., 2004). For example, contacts with outside organizations as part of the transition planning process are made primarily with PSE institutions.
and employers for students with employment and PSE goals. Moreover, previous studies have demonstrated the association between disability categories and post-school goals. Cameto et al. (2004) also found that while 10% of students with an intellectual disability have a PSE goal, more than 70% of students with visual impairments have a PSE goal stated in their IEPs. In addition, post-secondary vocational training was planned for about 40% of students with disabilities overall, especially for students with other health impairments (60%).

Grigal, Hart, and Migliore (2011) examined the post school goals of more than 520 students with an intellectual disability identified by school districts. The primary objective of this study was to compare students with an intellectual disability to students with other disabilities regarding post-school transition goals listed on their IEPs/Transition Plans, contacts/referrals made to outside agencies during transition planning, participation of other agencies/organizations in transition planning (e.g., vocational rehabilitation and higher education representatives), and students’ post-secondary education and employment outcomes. To answer the research questions, the researchers recoded NLTS-2 variables to include responses from multiple waves. For instance, the variable describing whether competitive employment was a post–high school goal was recoded to include responses provided during both wave one and wave two of data collection, the two waves when this question was asked. The results revealed that the most frequently reported goal on the IEPs of students with an intellectual disability was to prepare for independent living (50%) followed by competitive employment (46%), supported employment (45%), sheltered employment (33%), post-secondary vocational training (25%), and 2 or 4 years of college (11%). The transition goal of attending a 2- or 4-year college was reported less often for students with ID than for students with other types of disability (11% vs. 58%; \( p < .001 \)). In contrast, supported employment was reported as a transition goal more frequently for students
with ID compared to students with other disabilities (45% vs. 7%; \( p < .001 \)). In addition, the external program most often contacted for students with ID was their state’s Vocational Rehabilitation agency.

Daviso et al. (2011) conducted a study with 416 students who had been identified with learning disabilities to examine the relationship between the students’ secondary program, transition services, and their post-school goals. The participants were surveyed as part of the Ohio Longitudinal Transition Study (OLTS). This survey consisted of two parts: a student record review and a student/family interview. It was derived from a follow-up survey developed by Ohio’s systems change project for transition (Baer et al., 2003), and from follow-up surveys developed for the NLTS-2 study. The predictive model for expectations of participating in PSE indicated that students who attended regular high schools and passed all areas of their proficiency tests were more likely to identify PSE as a post-school goal. Moreover, the preparation of students who expected to enroll in PSE included some general education academics classes (90%), career and technical education (57.9%), and work-study participation (30%). Results of this study also showed that females were significantly more likely to choose a 2-year college (\( \chi^2 = 4.239, p < .026 \)) and 4-year college (\( \chi^2 = 4.34, p < .025 \)) compared to males. Male students were significantly more likely to choose technical school (\( \chi^2 = 10.46, p < .001 \)) compared to their female peers.

Weiss, Hutchins, and Meece (2012) conducted a study with 3,318 11th- and 12th-grade students from 73 randomly selected schools. The aim of this study was to investigate students’ post-secondary goals and how well students were preparing for the stated goals. The researchers administered a survey to a nationally representative sample of students with disabilities and their peers without disabilities in rural high schools. This survey instrument included information
about educational plans, academic program enrollment, information about post-secondary options, and post-secondary preparation activities. Findings from this study indicated that while 78.5% of students with disabilities reported they wanted to continue their education beyond high school, only 5.8% of them were enrolled in a college preparatory program. Students with disabilities were less likely than expected to have already taken both college entrance exams (17.8% SAT; 15.5% ACT) and more likely than expected to respond that they had not thought about the entrance exams (25.1% SAT; 19.4% ACT; Fisher’s exact probability ≤ .001 for each). Moreover, 25.5% of students with disabilities did not know which program they were enrolled in. This included 21.1% of students who wanted to continue their education and 53.1% who were unsure about future PSE plans. Consistent with the findings of Grigal et al. (2011), this study also found that there was a significant overall relationship between disability and educational plan, \( \chi^2 (2, n = 3,281) = 46.96, p < .001 \).

**Commitments**

External commitments (e.g., family obligations and employment) play an important role in the process of departure from an institution of higher learning. These external forces affect post-school goals and commitments, and thus contribute to the likelihood of departure from college (Tinto, 1993). Employment represents the largest external commitment for students with disabilities. Data from the NLTS-2 show that more than 60% of students with disabilities have a goal related to employment (competitive, supported, or sheltered employment; Cameto et al., 2004). Since the current study focuses on the potential relationship between external commitments (e.g., employment) and PSE completion, it is important to understand the research that has been done related to employment for students with disabilities. Four of the five studies that examined employment focused on preparation for, and participation in, employment for
students with disabilities (Guy, Sitlington, Larsen, & Frank, 2009; Grigal et al., 2011; Joshi, Bouck & Maeda, 2012; Schley, Walter, Weathers II, Hemmeter, Hennessey, & Burkhauser, 2010).

Joshi, Bouck and Maeda (2012) used data from the NLTS-2 to explore the extent to which students with mild ID participated in employment-related transition activities, the relationship between participation in these activities and school demographic variables, and the relationship between these activities and post-school employment outcomes. The data examined in this study were primarily drawn from the parent/youth surveys in waves one through four. Logistic regression analysis revealed both paid work experiences apart from school-sponsored jobs, and school-sponsored work experiences, significantly predicted employment. Students with a mild intellectual disability were more than five times as likely to engage in employment after school if they engaged in paid-employment experiences while in school, and more than three times as likely to engage in employment after school if they experienced a school-sponsored job. Findings from this study also indicated that the majority of students with a mild intellectual disability participated in employment-related transition activities; nearly all students (99.7%) reported participating in at least one activity (e.g., career counseling, instruction in looking for jobs, paid work experiences, job shadowing).

Curtin and Garcia (2011) used a repeated measures design to examine the relative effectiveness of work based interventions (service learning and paid employment) for meeting the need for improved social, interpersonal and work skills for 57 transition age adolescents with emotional and behavior disorders (EBD). Specifically, this study sought to examine possible differences between service learning and paid internships for overall work performance, and how these experiences affected students’ social competence. Participants were 11th and 12th grade
adolescents with EBD from 11 different non-public special education schools in the metropolitan and surrounding areas of Washington, DC and Baltimore, MD. This sample was mostly male (73.7%), fairly balanced between African Americans (49.1%) and Caucasian (42.1%), while the remaining (8.8%) were of Hispanic background. All participants were placed at jobsites consistent with their interests and transition goals. In addition, participants worked between four to eight hours per week. Job placements for the treatment group (service learning) included non-profit and/or charitable organizations, such as a homeless shelter, food bank, nature center, nursing home, clothing center, or elementary school. Mentoring, reflection, and empathic learning were the unique components of this intervention. Job placements for the comparison group (paid internships) included typical paid competitive employment sites, such as restaurants, auto-body shops, salons, and retail. Data on work personality and social competence were collected using two instruments. The Work Personality Profile (WPP) measured employability strengths as well as deficiencies while the Walker-McConnell Scale of Social Competence and School Adjustment (WSSC) was used to measure the social behavioral competencies related to teacher, peer, and self-related school adjustment and social competence. Results showed that, while both groups improved their work performance over time, students who participated in service learning experienced more significant changes when compared with those who engaged in paid employment. For example, the service learning group improved significantly over the course of the intervention for overall social competence, self-control, peer relations, school adjustment, and empathy. The paid employment group did not significantly improve overall social competence, self-control, peer relations, school adjustment, and empathy. However, the pretest scores for the paid employment group were higher. The analysis did not show a
significant difference between groups on overall work performance, task orientation, social skills, work motivation, work conformance, and personal presentation.

Carter, Trainor, Ditchman, Swedeen and Owens (2011) examined the summer employment experiences of 220 youth with high-incidence disabilities to identify effective avenues for connecting high school students with disabilities to community-based work experiences during the summer. Participants included youth with emotional and behavior disorders ($n = 66$), mild ID ($n = 57$), and learning disabilities ($n = 97$). The average age of was 17.2 years ($SD = 1.3$), and 68.2% were male. Most (79.1%) were European American, 15.0% were African American, and 5.6% reported other races/ethnicities (i.e., Asian American, Latina/o, Native American Pacific Islander). The participants were involved in assembly work, babysitting at homes, childcare center or daycare, cleaning (janitorial), clerical, and farming among other employment opportunities. The researchers conducted structured telephone interviews to gather information about the employment and other summer activities of participating youth at two time points during the summer—mid-June and early August. In addition, three measures were administered to teachers to obtain data on students’ employment related strengths, social skills and problem behavior, as well as self-determination. These measures included; Transition Planning Inventory (TPI; Clark & Patton, 1997/2006), the Social Skills Rating System—Secondary Teachers Version (SSRS; Gresham & Elliott, 1990), the AIR Self-Determination Scale (AIR; Wolman, Campeau, DuBois, Mithaug, & Stolarski, 1994). Results showed that the majority of youth with disabilities still searching for a job received help from a family member or from an employment agency/program. Summer jobs most frequently involved work responsibilities related to food services (29.8%), cleaning (24.2%), cashiering (16.1%), and stocking (13.7%). Factors associated with weekly earnings included, employment
skills, self-determination, problem behavior and social skills. Problem behaviors were negatively related to weekly earnings. This study also showed that early work experiences during secondary school play an important role in shaping and furthering the career aspirations of youth. In addition, the employment experiences helped youth learn basic skills and work habits applicable in future occupations, discover career-related preferences and interests, and navigate interpersonal relationships more effectively.

Schley, Walter, Weathers II, Hemmeter, Hennessey, and Burkhauser (2010) examined the effect that PSE had on earnings and the duration of time spent in the Social Security Disability programs for 13,477 individuals who are deaf or hard of hearing. Data on education, demographics, family background, earnings and employment histories of the participants were obtained from the Social Security Administration and the National Technical Institute for the Deaf (NTID). Results from this study showed that graduation from college resulted in significant economic benefits for individuals who are deaf or hard-of-hearing. Baccalaureate graduates in this study earned about 66% more over their working lives than students who were not admitted in college. Sub-baccalaureate graduates earned 34% more than those who were denied admission. With respect to labor force participation, about twice as many non-graduates reported no earnings than did graduates.

Social Integration.

Definition. In the context of higher education, Tinto (1993) conceived social integration as the process by which a student establishes membership (or fails to establish membership) in the social systems of the college community. The quantity and quality of social interaction that students have with peers, faculty, and staff as a result of personal affiliations and day-to-day interactions reflect the attainment of membership in the college social system (Pascarella &
Terenzini, 2005; Rubin, 2012; Tinto, 2002). In many studies, social integration has been measured as a function of subjective feelings of fit/belonging while in others, (Berger & Milem, 1999; Pascarella & Chapman, 1983) social integration has been inferred from student behavior related to their participation in social organizations, amount of time spent socializing with peers and communication with faculty and staff.

Socially integrated students tend to participate regularly in campus recreational activities, and have meaningful social interactions with peers and faculty (Cheng, 2004; Elkins, Forrester, & Noel-Elkins, 2010, 2011). Pascarella and Chapman (1983) measured social integration by examining behavioral measures that reflect students’ participation in activities such as:

1) Average number of dates each month;
2) Number of best friends on campus;
3) Participation in informal social activities (e.g., number of times going out with friends for refreshments);
4) Number of weekends spent on campus each month;
5) Time spent with college friends;
6) Peer conversations; and
7) Informal contact with faculty.

Similarly, sociological research recognizes the distinction between individual’s perceptions of social integration and observed integration (based on the researchers’ perception of what constitutes integration). Perceived integration, which captures the extent to which an individual feels a part of a specific social group, is composed of two dimensions: a sense of belonging and feelings of morale associated with group membership (Hurtardo & Carter, 1997). Perceived integration may mediate much of the influence of objective measures of integration.
(Bollen & Hoyle, 1990). Hurtado and Carter (1997) observed that the conceptual distinction between psychological measures of integration (students’ sense of integration) and behavioral measures of integration (actual participation in campus life) merit further study. However, Tinto (1993), suggested that the mere occurrence of interactions between the individual and others within the institution does not necessarily ensure that integration occurs. Integration depends on the character of those interactions and the manner in which the individual comes to perceive them as rewarding. In this sense, social integration may be inferred from student’s satisfaction with their social experiences in college. In this study, only behavioral measures of social integration will be considered; the NLTS-2 database did not include psychological measures of social integration that correspond to the times when participants were in college.

In all, four articles examined issues related to social integration and PSE success for students with disabilities (Shepler & Woosley, 2012; Hodges & Keller, 1999; DaDeppo, 2009; Mamiseishvili & Koch, 2011). DaDeppo (2009) and Mamiseishvili and Koch (2011) examined the impact of social integration on PSE persistence behavior (i.e., intent to persist and persistence form year one to year two) using Tinto’s student integration framework (Tinto, 1987,1993). Both studies considered a variety of pre-entry variables (e.g., race, gender, mother’s education, social economic status, high school GPA, SAT scores) as well as institutional experiences such as social and academic integration, and college GPA. The two articles (Shepler & Woosley, 2012; Hodges & Keller, 1999) that focused on social integration experiences of students with disabilities in college also alluded to the student integration model.

Social integration experiences. Shepler and Woosley (2012) collected data on first-time freshmen who had registered with the university’s office of accessible student services at a medium-sized public university. This study sought to understand the early social integration
experiences of students with disabilities in college. The sample was composed of both male (41.7%) and female (58.3%) students with disabilities. Of the 120 participants, 86 (71.7%) identified themselves as White while 34 (28.3%) were racial/ethnic minorities. Data for this study were collected from the annual first-year student survey (Making Achievement Possible [MAP-Works] survey) and institutional records (admissions and demographic data). Based on Tinto’s (1993) conceptual model, the researchers identified three levels (or blocks) of variables for the analytical procedure. First, pre-entry variables were included (gender and admissions test scores); second, variables measuring commitment to higher education were considered; and third, factors reflecting the campus environment were used (e.g., involvement in campus organizations and basic academic behaviors). Social integration was computed using three items measured by the MAP-Works peer connection scale. Student gender was treated as a categorical variable and was collected from university records. Admissions test scores were also obtained from university records. Results from this study indicated that the statistical model that significantly predicted social integration included pre-entry variables (gender and admissions test scores), commitment, college environment academic behavior, and involvement. In addition, students’ perceptions of the on-campus environment and their expectations for involvement with campus organizations were significant factors in predicting their social integration. While both pre-entry and college related factors contributed to social integration, the researchers also found that the college environment and student involvement were the only factors that independently predicted social integration.

Hodges and Keller (1999) conducted a study to investigate the perceptions of college students with physical and visual impairments on what influenced their social integration at a metropolitan university designated as a doctoral granting institution. The participants responded
to a mailed survey and took part in semi-structured in-depth interviews. The first part of the study included 97 undergraduate students, identified by the Office of Accessible Student Support as having physical disabilities, who completed questionnaires about their involvement with extracurricular activities on campus, levels of difficulty resulting from impairment, and demographic information. Twenty-eight of these students identified visual impairment as their primary disability. The semi-structured interviews were conducted with six students who identified themselves as having visual impairments, attended college full-time, and enrolled in a minimum of 12 semester credit hours. Of the six students who participated, three were females and three males, all ranging in age from 22 to 47. The interview protocol was developed using open-ended questions and probes which addressed social integration.

Findings from this study indicate that all the participants were more socially integrated at the university than they had been in high school. The strongest contributor to social integration that the participants perceived was personal initiative. Consistently, the participants reported taking the lead in initiating social interactions with peers. In addition, living on campus was associated with higher levels of social integration. Students who stayed on campus all day reported more interaction with peers, such as eating together at the student union and hanging out with them while waiting for transportation. However, none of the participants reported using any of the recreational facilities at the student union. The inability to drive was a major problem for all the participants because it lessened opportunities for social involvement, and limited where they could live. In this community, public transportation was limited and often unavailable during evenings and weekends when many social activities took place.

Even though all participants were involved in external commitments (e.g., church, volunteering), these commitments did not have a negative impact on their social integration as
has been suggested in previous research (Astin, 1984). Each participant was involved in at least one organization away from campus. Two were active in their churches, two did volunteer work, and three (all male) participated in off-campus athletic programs, but none perceived that his or her off-campus activities interfered with on-campus activities. Similarly, family backgrounds did not impact participants’ social interactions. Results from the study showed that parents' educational levels and expectations for college attendance did not influence social activities.

**Social integration and persistence in PSE.** DaDeppo (2009) conducted a study with 97 college freshmen and sophomores with learning disabilities attending a large, four-year public institution in the southwestern United States to investigate the impact of academic and social integration on intent to persist and college GPA. The Freshman Year Survey (FYS; Milem & Berger, 1997) was used to measure academic and social integration. The *FYS* is a self-report measure that requires respondents to indicate on a four-item Likert scale, how much they agree with statements regarding their own academic and social integration at the university. The academic and social integration scale found on the *FYS* includes a total of 18 items, ten of which assess academic integration and ten of which assess social integration, with two items overlapping on the scale (DaDeppo, 2009). Students who participated in this study were primarily white (89%), male (59%), and reported their mother had at least a college degree (76%). The age range of the students was from 18 to 22 years; 60% were freshmen and 40% sophomores. Seventy percent of the participants reported living on campus in dormitories or fraternity or sorority housing, while 26% lived off campus alone or with roommates, and the remaining 4% resided with their parents. Results showed that social integration accounted for 18% of the variance in intent to persist, above and beyond that accounted for by background characteristics and past academic achievement. Significant correlations in this study also
included a positive relationship between academic integration and social integration. However, academic and social integration did not individually, or collectively, account for significant variance in college GPA above and beyond background characteristics and past academic achievement.

Similarily, Mamiseishvili and Koch (2011) used the data from the Beginning Post-secondary Students Longitudinal Study survey (BPS:04/06) to identify factors that influenced first-to-second-year persistence of a sample of college students with disabilities classified as first-time beginners. The BPS data set provides a nationally representative sample of students, including transfers, persisters, stopouts/dropouts, and vocational completers (Cominole et al., 2007). In this study, both social and academic integration variables were collapsed into a dichotomy: 0 = students never participated in any of the social and academic activities and 1 = students participated in activities representative of academic and social integration at least once or more often. Participants in this study included 1,910 students who reported having some type of long-lasting disability or condition that had lasted six months or more and had first enrolled at post-secondary institutions in the fall of 2003. Results from chi-square analyses revealed that students who never participated in any of the social activities on campus (e.g., school clubs, school sports, and fine arts activities) were less likely to persist through the second year than students who were engaged at least sometimes in any of these activities. Furthermore, the findings suggest that social integration has a stronger positive influence on persistence than academic integration. Academic and social integration or disability-related accommodations were not significant in the final logistic regression model, after controlling for all the other variables (e.g., demographic, entry, and in-college characteristics).
Synthesis

Predictors of PSE enrollment. All the studies investigating PSE enrollment considered a variety of measures of student and family characteristics such as gender, income, and disability (Chiang et al., 2012; Kaminski et al., 2006; Halpern et al., 1995; Fleming & Fairweather; 2012; Rojewsky, 1999; Williamson et al., 2010). This body of research presented mixed conclusions regarding the impact of student and family characteristics on PSE enrollment. For example, while Halpern et al., (1995) found that annual family income was not associated with enrollment in PSE, Chiang et al. (2012) found that among students with autism, household income significantly predicted PSE enrollment. Similarly, Chiang et al. (2012) found that academic performance significantly predict PSE enrollment. Williamson, et al. (2010) on the other hand found that variables related to academic performance, were not statistically significant in the prediction of PSE enrollment within six months following graduation. Studies that used regional samples such as Williamson et al. (2010), and Halpern et al. (1995) consistently found that a number of family, student, and high school outcomes (e.g. income, gender) were less influential in predicting PSE enrollment. In contrast, studies that used nationally representative samples (e.g., Chiang et al., 2012 and Rojewsky, 1999) consistently found that family, student, and high school outcomes significantly predicted PSE enrollment. It is likely that the impact of some of the family, student and high school variables (e.g. income, gender) vary across different geographic locations. Thus, there appears to be some justification to consider family, student, and high school variables examined in the studies discussed above when using nationally representative samples.

Though some studies presented contradictory findings, many found results that were consistent. For example, three studies (Chiang et al., 2012; Fleming & Fairweather, 2012;
Rojewsky, 1999) found that high school grades or academic performance positively influenced PSE enrollment. Likewise, Halpern et al. (1995) and Rojewsky (1999) found that receiving instruction in general education settings significantly increase the odds of enrollment in PSE. All but one of the studies that examined PSE enrollment focused on students preparing for, or enrolled in two and four-year colleges. One study (Fleming & Fairweather, 2012) included students who enrolled in vocational programs, and found that disability-related factors such as accommodations, severity, and type of disability had a larger influence on vocational–technical education participation as compared to two and four-year colleges. Little is known about the factors that influence PSE outcomes for students who enroll in post-secondary vocational programs. It is therefore important to investigate whether variables known to influence PSE outcomes (such as instructional setting, academic performance, and family characteristics) have a similar impact for those students enrolled in vocational programs.

**Predictors of PSE completion and success.** Twenty percent (8 out of 40) of the studies reviewed focused on factors that influence program completion or overall PSE success. (Unger et al., 2000; Barber, 2012; Jameson, 2007; Getzel & Thoma, 2008; Wessel et al., 2009; Richardson, 2009; O’Neal, et al., 2012; Lombardy, et al., 2012). Unlike studies that examined PSE enrollment, studies that investigated completion and success did not offer mixed findings. For example, Barber (2012), Jameson (2007), and Getzel and Thoma (2008) all found a relationship between Self-advocacy/self-determination and PSE success. These studies showed that self-advocacy is a critical skill for students with disabilities in PSE. Similarly, Wessel et al. (2009), Richardson (2009) and O’Neal, et al. (2012) found that older students and females are more likely to complete PSE. Overall, a few patterns were observed across these studies. First, the majority (75%) of the studies that examined PSE completion focused on the impact of PSE
supports, accommodation, and relationships developed in institutions of higher learning. Factors such as support from friends, instructors, and/or academic support personnel, distraction-reduced testing, and assistance with learning strategies/study skills were found to contribute to PSE success. Only one study (Lombardy et al., 2012) considered the effect of high school academic preparation. Lombardy et al. (2012) found that receiving language arts and math in general education contributes to PSE completion or enrollment. Despite the legal requirement of IDEA 2004 to provide comprehensive transition services, key transition practices such as helping students choose goals for their future, improving social skills, having paid work experiences, and receiving vocational services were not considered in the studies investigating PSE completion. Our understanding of the impact of PSE related factors coupled with limited attention to high school transition experiences may not provide a complete picture of PSE transition process or of the factors that work together to improve PSE completion rates for youth with disabilities.

**Employment.** Four studies examined the impact of employment on post-school employment outcomes, including earnings (Carter et al., 2011; Curtin & Garcia, 2011; Joshi et al., 2012; Schley et al., 2010). None of these studies examined the impact of high school employment on PSE enrollment or completion. However, high school employment opportunities such as service learning and summer paid employment was linked to improved student self-determination (Carter et al., 2011), improved interpersonal and problem-solving skills (Curtin & Garcia, 2011; Joshi et al., 2012) and decreased reliance on public assistance (Schley et al., 2010). Furthermore, Curtin and Garcia (2011) found that these positive outcomes are more likely to occur for those students who participated in service learning activities in employment settings compared to those who had paid employment, although the types of employment settings were not consistent across each group. For example, students in paid employment were more likely to
be working in jobs that required following set procedures rather than those that offered more opportunities for problem-solving or innovation. These four studies support the consideration of employment as a factor that could positively impact students’ PSE completion.

Social integration. A total of four of the 40 (10%) articles focused on variables associated with social integration. Two of these articles (Shepler & Woosley, 2012; Hodges & Keller, 1999) examined factors that influence social integration. However, there was considerable variation in methodology, and variables of interest across the two studies. Shepler and Woosley (2012) conducted a quantitative study, and found that factors such as gender, admissions test scores, commitment, college environment academic behavior, and student involvement predicted social integration. Hodges and Keller (1999) on the other hand conducted a qualitative study, and found that contributors to social integration included personal initiative, and living on campus. Despite the disparity in variables of interest, both studies suggest that factors associated with PSE settings such as living on campus influence social integration. The other two studies (DaDeppo, 2009; Mamiseishvili & Koch, 2010) focused on the impact of social integration on persistence behavior. Both studies concluded that social integration affects students’ persistence behavior. For example, Mamiseishvili and Koch (2010) found that students who never participated in social activities on campus (e.g., school clubs, school sports, and fine arts activities) were less likely to persist through the second year than students who were engaged at least sometimes in any of these activities. The trend across the studies that examined variables associated with social integration indicate that institutional factors such as student involvement, and living on campus impact social integration. Furthermore, social integration is an important predictor of persistence behavior. However, none of the studies reviewed examined the relationship between factors associated with social integration and persistence until
Summary

In conclusion, the majority of studies investigating success for students with disabilities sought to explain PSE outcomes based upon similar sets of independent variables. These variables included high school academic experiences, student and family characteristics, PSE services, and scores on college entrance exams. Across studies, similar sets of predictor variables influenced more than one PSE outcome. For instance, gender, high school academic performance, and age were significant predictors of the likelihood of PSE enrollment and graduation. Similarly, gender and self-advocacy were associated with the likelihood of social integration and academic success. These findings lend credence to the student integration model (Tinto, 1975, 1987, 1993) that assumes a longitudinal relationship between pre-entry variables, institutional experiences, and a range of PSE outcomes. While these studies reveal the relationships between pre-entry factors and PSE outcomes, none provides an explanation about how these variables affect PSE outcomes. In addition, a few studies examining the relationships between pre-entry variables and PSE participation offer contradictory conclusions. For example, while Chiang et al. (2012) found that demographic variables (gender, age, disability) significantly predicted likelihood of enrollment, Halpern et al. (1995) found that gender, disability, and age did not predict likelihood of enrollment in PSE. Given the disparate findings, it is important to re-examine the impact of pre-entry variables. The proposed study is built upon the understanding that there exists a longitudinal causal relationship among variables reflecting pre-entry experiences, commitments, and goals and PSE outcomes such as social integration and persistence until completion as proposed by Tinto (1993).
Chapter 3

Methodology

Problem statement and purpose. The purpose of this study was to determine which antecedent conditions (e.g., pre-entry attributes, goals and commitments) contribute to PSE completion for students with disabilities, taking into account institutional experiences associated with social integration. Previous studies have supported the influence of pre-entry variables (gender, self-determination, high school academic performance) and institutional experiences on PSE completion for students with disabilities. However, few studies have examined both direct and indirect effects of these variables on PSE completion. Mediation analysis was conducted in this study to identify and explicate the mechanism or process that underlie the observed relationships between pre-entry variables and PSE completion through the inclusion of institutional experiences related to social integration. The present study assessed how: (1) High school achievement, self-advocacy, post-school goals, high school academic courses, participation in extra-curricular activities, and participation in employment are associated with post-secondary education completion; and (2) Whether institutional experiences associated with social integration mediate the relationship between pre-entry factors and PSE completion. The study hypotheses are as follows:

Hypothesis 1: Pre-entry variables (high school achievement, self-advocacy, post-school goals, high school academic courses, participation in extra-curricular activities, and participation in employment) predict PSE completion; and
Hypothesis 2: Holding demographic factors constant, the relationships between the pre-entry variables and PSE completion will be mediated by institutional experiences associated with social integration

**Rationale for Analysis of the National Longitudinal Transition Study-2 Data.** For many researchers, secondary data offers a cost effective means of conducting research that would otherwise be expensive and time intensive. In addition, the breadth of data available in databases such as the NLTS-2 allows for the examination of a variety of constructs associated with post-secondary outcomes. Numerous studies examining post-school outcomes for students with disabilities have used the NLTS-2 database. Moreover, the NLTS-2 data set is longitudinal; hence, it offers information about the same group of individual over several time periods. This allows researchers to look at trends and changes in phenomena over time. A fourth potential advantage of using the NLTS-2 data is that the data collection process was guided by expertise and professionalism that may not be available to individual researchers or small research projects.

**Data source.** This study used data from the National Longitudinal Transition Study-2 (NLTS2). After re-authorizing IDEA (1997), Congress mandated the US Department of education to conduct an assessment of the implementation of the law, occasioning a series of longitudinal studies (Valdes et al., 2009). The NLTS2 was one of the seven child-based studies commissioned by the Department of Education that documented the secondary school experiences and the transition to adult roles for secondary age youths with disabilities. This nationwide longitudinal investigation overseen by the Office of Special Education Programs (OSEP) was conducted over a period of 10 years. The study documented the experiences of more than 11,000 youths who were ages 13 to 16 as of December of 2000 as a follow-up to the
original NLTS. The initial intent of Stanford Research Institute (SRI International, 2000, January) was to sample 12,943 youth to participate; however, only 11,272 agreed to participate in the first data collection point (SRI International, 2000b).

To facilitate the assessment of the effectiveness of IDEA, the NLTS2 focused on the youth, youth characteristics, services that are provided to youth and the outcomes they achieve. The individual disability categories covered in the study included students with specific learning disabilities, traumatic brain injury, deaf-blindness, hearing impairment, intellectual disabilities (described as mental retardation), emotional disturbance, speech and language impairments, visual impairment, multiple disabilities, autism, orthopedic impairments and deaf. This study also sourced information from a variety of respondents using a variety of instruments; providing an opportunity to answer a wide range of descriptive, longitudinal and explanatory research questions. The longitudinal nature of data collection also permits the examination of change over time, allows for the connection of characteristics and services to outcomes achieved at different points in time as well as longitudinal outcomes.

**Sampling design.** The sampling procedure used in the NLTS2 was conducted in two stages beginning with school districts and then students. In the first stage, a stratified random sample of local education agencies (LEA) was selected to reflect the geographic regions, enrollment, socio economic status of the school district, and all the special schools that provide services to students with hearing and visual impairments in each state. Of this sample, approximately 3,630 LEAs and 80 state-supported special schools were invited to participate, with approximately 500 LEAs and 40 special schools agreeing to participate. Analyses of potential bias of the LEA sample have shown that there are few important differences in the selected sample compared to the universe of LEAs in region, size, or wealth, or on other
important characteristics (Javitz & Wagner, 2003). The only statistically significant differences between respondents and the universe of potential respondents as reported by states to the OSEP for their entire population of students in special education were found in: (a) the percentage of parents who earned less than $25,000 a year, were satisfied with their child’s school, volunteered at school, expected that their child would pursue post-secondary education; and (b) the percentage of youth who attended their neighborhood school that had been held back a grade, and had been suspended or expelled. However, these differences were small (at most a difference of 5.6%) and of little practical importance (Javitz & Wagner, 2005). All other differences between respondents and the universe of potential respondents were controlled for through weights developed for each instrument, thereby ensuring that the characteristics of the respondent sample closely resembled those of the potential eligible sample. In the second stage, LEAs and the state supported schools provided rosters of students that fit the age bracket of interest and were at least in seventh grade. These rosters were used to randomly select students within each of the 12 disability categories. The youth on the special education rosters were categorized by primary disability category and grade.

**Data collection methods and instruments.** The NLTS2 included data collected from parents, youth, teachers, and school administrators. These data were collected through telephone interviews, mail surveys, face-to-face assessments, as well as transcripts collected from schools. The first interview contact (Wave 1) focused on parents or guardians of eligible sample members. The parents were interviewed through the computer assisted telephone interviewing (CATI) or mail surveys. Items in this portion of the interview, referred to as Parent Part 1, focused on topics for which the parent was considered the most appropriate respondent such as services received, family expectations of the youth’s abilities, disabilities, family background,
supports for education provided at home and; they were interviewed every two years through waves one through five. Data collection for the NLTS2 was conducted in five waves (2001-2002, 2003-2004, 2005, 2007, and 2009). In addition, the response rates of the individual data collection instruments used in this study varied from 48.1% on the 2003 School Program Survey administered at the third data collection point to 82.1% on the 2001 Parent Interviews at the first data collection point.

The instruments used in data collection comprised Parent Interviews, Youth Interviews, direct assessments and youth in-person interviews, Teacher Surveys, School Program Surveys, School Background Surveys, and high school transcripts. Not all instruments were administered at every data collection point. The conceptual framework upon which the NLTS-2 was grounded assumed that parents/guardians were most knowledgeable about information on age when disability was first identified, socioeconomic status, and the family's level and type of involvement in school. It was also assumed that parents were important sources of information on outcomes across transition domains (e.g., independent living, employment and PSE). Thus, parents/guardians of NLTS-2 sample members were interviewed first at wave one before the youth were contacted. For the purpose of this study, the following sources of data will be used: Youth Assessment (Direct assessment), Parent/Youth Phone Interview and/or Mail Survey, General Education Teacher Survey, School Program Survey, and the School Characteristic Survey.

**Youth assessment (Direct assessment).** Direct assessments were conducted with sample members for whom a parent interview had been completed and parental consent for the assessment had been completed. About 5,956 students were eligible for these assessments at wave one. These data were only gathered at one point during the 10-year data collection period.
The direct assessment of youth included measures of reading comprehension and math skills, vocabulary, science and social studies content knowledge, as well as interviews about self-concept and self-determination. The NLTS-2 also included a functional rating for youth with disabilities for whom the direct assessment was reported to be inappropriate because their sensory, physical, behavioral, or cognitive disabilities made them unable to follow instructions or answer questions reliably in spoken or written English, Braille, or large print. The functional rating instrument was the adult-completed Scale of Independent Behavior-Revised (SIB-R). The SIB-R is a comprehensive measure of adaptive and problem behaviors related to functional independence and adaptive functioning in school, home, employment, and community settings. Its 18- to 20-item subtests focus on motor skills, social interaction and communication skills, personal living skills, and community living skills. These four clusters were combined into an overall scale referred to as "broad independence." The SIB-R has normal samples to allow comparison with the general population. The response rate for student assessment was 53.6%.

**Parent/Youth phone interview and/or mail survey.** Parent interviews were conducted during each of the five different data collection waves beginning in 2001 and ending in 2009 while youth were interviewed in waves two to five. This survey was primarily a telephone interview supplemented by mail surveys in cases where conducting telephone interviews was not feasible. The parent/guardian version had fewer questions than the one administered to the youth. Topics covered in the instrument included youth characteristics, household characteristics, non-school factors (such as group activities, expectations), family involvement, personal/social (e.g. friendships, social skills), academic (e.g. school completion, PSE attendance) employment, citizenship (e.g. volunteering), responsibility, and levels of satisfaction with jobs, employment and PSE. The youth interview/survey was generally customized based on responses received
from parents in Wave one. Using the computer-assisted telephone interviewing (CATI) system, questions were asked conditionally to reduce the burden on respondents. Using these definitions of eligible samples, response rates for telephone interview with parents in wave one exceeded 80%. Although parent interview data were collected in waves four and five, only 7% and 2% of the NLTS2 sample, respectively, were reported to have been enrolled in secondary school or receiving similar instruction in the previous year during the wave four and five data collection periods (Newman, et al., 2011).

**General education academic teacher surveys.** For sample members who were reported by school staff to be participating in at least one general education academic class, teachers of the first such class in each student's school week were surveyed. The first academic class in the week was selected so that information would be provided on a wide range of objectively selected classes taken by youth with disabilities. General education academic teachers were asked to report background information on the class, the instructional practices used with specific individual students in the class, and other instructional practices used with the entire class. This instrument aimed at obtaining information about the nature of experiences of secondary school students with disabilities in the general education curriculum. Teachers also reported on the supports they received because specific individual students with disabilities were in their classes and on their perceptions of the appropriateness of the students' placements in their classes. About 7,650 students were eligible for the survey at the beginning of wave one. The response rate was 36.3%

**School program surveys.** Information relevant to sample members’ overall school program was gathered from the person deemed to be most knowledgeable about students’ school experiences (often the special education teacher). The key aspects of the school program targeted
in this survey included, courses taken, related and support services, transition planning, and school performance. In addition to this general information, the survey collected information about instructional practices in both special and vocational education classes (Valdes et al., 2006b). A total of 5,635 School Program Surveys were completed at the second data collection point, resulting in a 53.1% response rate. A total of 4,278 School Program Surveys were completed at the fourth data collection point, resulting in a 52.2% response rate for the practical sample (Valdes et al., 2006a).

**Sample**

The participants for this study were drawn from the original sample of 2,500 students who reported having enrolled in two-year or community colleges, post-secondary vocational/business, or technical schools, and four-year colleges after leaving high school. The primary sample for this study comprised of 1,180 (47.2% of the original sample) students who were currently enrolled during wave four data collection period. This sample was predominantly white (72.5%), had learning disabilities (72.5%), and was approximately evenly split on gender (58.9% male vs. 41.1% female). More youth in the primary sample were from families with annual household income of more than $50,000 (46.8% vs. 35.9% medium income and 17.3% low income). Additionally, a large majority of these youth were from families where only English was spoken at home (84.7% vs. 15.3%)

Students who had graduated by wave four ($n = 460$) and those who had left PSE for other reasons ($n = 750$) constituted the excluded sample excluded. In terms of demographics, 55.6% of students were male. These students were predominately white (74.9%), came from families where only English was spoken (86.2%) and had been diagnosed with Learning disabilities (66.3%). More youth in the excluded sample were from families with annual household income
of more than $50,000 (45.6% vs. 24.9% medium income and 29.5% low income). Table 1 presents the descriptive characteristics of the excluded sample and that of the primary study sample.

Figure 2. Selection criteria for the primary study sample.
Table 1

Comparative Summary of Student Demographic Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Primary Sample</th>
<th>Excluded Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N = 1,130</td>
<td>N = 1,170</td>
</tr>
<tr>
<td></td>
<td>Weighted %</td>
<td>Weighted %</td>
</tr>
<tr>
<td></td>
<td>Unweighted n</td>
<td>Unweighted n</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>58.9</td>
<td>55.6</td>
</tr>
<tr>
<td>Female</td>
<td>41.1</td>
<td>44.4</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>72.5</td>
<td>74.9</td>
</tr>
<tr>
<td>African American</td>
<td>13.6</td>
<td>11.4</td>
</tr>
<tr>
<td>Hispanic</td>
<td>11.1</td>
<td>10.7</td>
</tr>
<tr>
<td>Other</td>
<td>2.8</td>
<td>3.0</td>
</tr>
<tr>
<td>Household Income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$25,000 or less</td>
<td>17.3</td>
<td>29.5</td>
</tr>
<tr>
<td>$25,001-$50,000</td>
<td>35.9</td>
<td>24.9</td>
</tr>
<tr>
<td>More than $50,000</td>
<td>46.8</td>
<td>45.6</td>
</tr>
<tr>
<td>Primary Disability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning Disabilities</td>
<td>70.5</td>
<td>66.3</td>
</tr>
<tr>
<td>Speech Impairments</td>
<td>6.6</td>
<td>4.1</td>
</tr>
<tr>
<td>Other health Impairments</td>
<td>5.3</td>
<td>6.6</td>
</tr>
<tr>
<td>Other Disabilities</td>
<td>17.6</td>
<td>23.0</td>
</tr>
<tr>
<td>Language other than English spoken at home</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>15.3</td>
<td>13.8</td>
</tr>
<tr>
<td>No</td>
<td>84.7</td>
<td>86.2</td>
</tr>
<tr>
<td>Education status of mother</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than high school</td>
<td>19.7</td>
<td>9.0</td>
</tr>
<tr>
<td>HS grad or GED</td>
<td>18.2</td>
<td>32.2</td>
</tr>
<tr>
<td>Some College</td>
<td>30.7</td>
<td>29.5</td>
</tr>
<tr>
<td>B.A or Higher</td>
<td>31.4</td>
<td>29.4</td>
</tr>
</tbody>
</table>

Note. Unweighted frequency values (n) have been rounded to the nearest 10, in conformance with Institute of Education Sciences requirements.

Variables. To test the research hypothesis guiding this study, a number of variables were obtained from the wave one parent survey, wave one and two program survey, wave two, four and five parent/youth survey, and transcript data. All the independent measures were obtained from waves one and two. This is because these data were collected at a time when the majority of the participants had not completed high school and enrolled in PSE. Variables associated with
social integration in PSE were obtained from the parent/youth surveys in wave four. The next section will provide a detailed description of the selected variables, the instruments from which they were obtained, and the coding process.

**Dependent measure (Post-secondary education completion).** The outcome of interest for PSE completion was whether youth had ever obtained a diploma, certificate or license from a PSE setting. This variable corresponded to a combination of responses to the survey questions, *Have you gotten a diploma, certificate, or license from a (a) vocational, business, or technical school (b) two-year or community college (c) four-year college or university.* The completion variable is a dichotomous variable (0=no and 1=yes). This variable was set to the youth’s response if the youth was interviewed; otherwise it was set to the parent’s response.

**Predictor variables.** *Demographics.* Previous studies examining post-school outcomes of students have considered a variety of variables representing family backgrounds and student characteristics. These include; annual family income, gender, race, parental level of education, and disability, (Chiang et al., 2012; Halpern et al; O’Neal et al., 2012; Mamiseishvili & Koch, 2011; Wessel et al., 2009). In this study, demographic data were obtained from parents’ responses to the parent survey in Wave one. However, the disability label reflected the district-designated disabilities as listed in the school records. Aside from these demographic variables, the variable reflecting language spoken at home was included. This study considered language spoken at home as an indicator of diversity in response to criticisms of the student integration model (Tinto, 1975, 1987, 1993). Tinto’s critics have suggested that the implications of variables key to the student integration model such as family background and social integration may vary for individuals from diverse cultural backgrounds. For instance, Torres and Solberg (2001) found that social integration did not predict persistence intentions amongst Latino students. The
language spoken at home provides a broad measure of the minority status and has also been used as a proxy for acculturation (Gee et al., 2012). Appendix A provides an overview of the sources, and the levels of measurement

**Skills and abilities.** Previous research suggests that when students lead their IEP meetings, there are a number of positive outcomes. Mason, McGahee-Kovac, and Johnson (2004) observed that the students who lead their meetings were able to advocate for themselves, knew about their disability rights and accommodations, and gained increased self-confidence. In this study, self-advocacy was measured by the role a student plays in IEP meetings. In the wave one-parent interview/survey, parents were asked:

Which of the following best describes youth’s role in {his/her} IEP?

1. {He/She} was present in discussions but participated very little or not at all.
2. {He/She} provided some input.
3. {He/She} took a leadership role, helping set the direction of the discussions, goals and plans?
4. Don’t know about any goals.

This variable was obtained from the combined parent/youth wave one instrument.

**Prior schooling.** In the review of literature in chapter two, several school-related variables were found to be significantly predictive of PSE outcomes. These included attendance of regular school i.e., access to the general curriculum, high school academic performance (Average vs. above average), participation in extra-curricular activities, participation in advanced mathematics courses, and general education English courses as well as student satisfaction with instruction received. Corresponding variables for each of these components of prior schooling were found in the NLTS2, program survey and wave one parent survey. These variables include:
(npr2A3a_1) Instructional settings for language arts (if received): General education classroom
(npr2A3b_1) Instructional settings for mathematics (if received): General education classroom
(npr2A3e_1), participated in any extracurricular activities. Academic achievement was measured by students’ grade point average available in the transcript data. This variable was coded as, (ntgGPA) GPA earned in all courses (in any setting) in this grade

Goals/Intentions. The studies reported in chapter two indicated that while transition plans for many students with disabilities include PSE, employment and independent living goals, having PSE as a primary post school goal significantly increases the odds of enrollment in PSE (Chiang et al., 2012). The corresponding NLTS-2 variables that reflect transition goals were obtained from the student’s program survey instrument. This information was gathered from the teacher most knowledgeable about the students’ programs of study. The selected variables comprised of: (a) Primary goals for student: Prepare for post-secondary ed (npr2D4_11) (b) Primary goal for student: Develop vocational skills (npr2D4_10)

External commitments. Newman et al (2011) noted that many students with disabilities engage in employment and education beyond high school. Some students commit their time to employment while attending school. The variable, (np1AnyPaid) Any paid job or work study in past year will be used as a measure of participation in employment. This variable has two levels coded as follows: 0= No and 1= Yes.

Mediator variables (Institutional experiences associated with social integration). The NLTS-2 parent/youth surveys included many variables reflecting behavioral measures of social integration. The following variables were selected as indicators of social integration:
(np4P10_J6) How often youth got together with friends outside of organized activities in the past 12 months, (np4P12_J8) how often friends called youth on the phone in the past 12 months,
how often youth takes part in e-mail, instant messaging, or chat rooms, 
how often youth did hobbies in the past week, how often youth just hang 
out with friends in the past week, youth was invited to social activities with friends in 
the past 12 months. These variables were all taken from the parent/youth surveys conducted in 
wave four. Appendix A provides an overview of the sources, survey questions and the levels of 
measurement.

Categorical principal component analysis. The risk of making incorrect statistical 
inferences may increase as a function of the number of tests conducted. Including more variables 
increases the risk of making Type I error, therefore, it was necessary to reduce the number of 
variables associated with social integration in this study with minimal loss of information. 
Principal component analysis is a widely used data reduction technique that is useful in 
identifying patterns in data, and expressing the data in such a way as to highlight their 
similarities and differences. The goal of principal component analysis is to aggregate several 
indicators into a single measure that represents most of the information found in the original set 
of variables (Field, 2006). Principal component analysis however, assumes that the relationships 
between variables are linear, and second, that its interpretation is only sensible if all of the 
variables are assumed to be scaled at the numeric level (Linting, Meulman, Groenen, & Van der 
Kooij, 2007). Since the variables associated with social integration selected in this study are 
categorical, these assumptions are not justified, and therefore, principal components analysis 
may not be the most appropriate method of analysis. These limitations are addressed though 
categorical (non-linear) principal component analysis. The advantages of categorical principal 
components analysis over linear PCA are that it incorporates nominal and ordinal variables and 
that it can handle and discover nonlinear relationships between variables. In addition, non-linear
principal components analysis can deal with variables at their appropriate measurement level, for example, variables measured at the interval or ratio levels (Linting et al., 2007).

In nonlinear PCA, categories of variables are assigned numeric values through a process called optimal quantification or optimal scaling. The optimal-scaling approach allows variables to be scaled at different levels. Categorical variables are optimally quantified in the specified dimensionality. As a result, nonlinear relationships between variables can be modeled. By reducing the dimensionality, it is possible to interpret a few components rather than a large number of variables. The original data set is then replaced by a smaller set with minimal loss of information. Categorical principal components analysis relies on the supposition that component scores have large correlations with each of the quantified data in the process of quantifying observed data. In this study, categorical principal components analysis could be used to graphically display the relationship among institutional experiences associated with social integration. It is likely that two dimensions account for a large amount of variance. The first dimension might separate going using chartrooms from being invited to social events, whereas the second dimension might separate visiting friends from using chat rooms. SPSS 20 was used to conduct categorical principal components analysis. As highlighted in the research previously discussed, social integration can be measured by individuals’ subjective feelings of fit/belonging or by behavioral indicators such as time spent engaged in social activities. Previous research also shows that social integration significantly impact persistence in college. While the NLTS-2 did not directly measure student’s feelings of fit/belonging based on their college experiences, six NLTS-2 variables measuring experiences associated with social integration were examined in this study. A categorical principal component analysis of the institutional experiences was conducted to transform these variables into a smaller number of uncorrelated variables (i.e.,
principal components).

The first step in identifying the components to retain was to examine the component loadings of the two hypothesized components in order to determine “whether the component has a sensible and useful interpretation” (Bartholomew, Steel, Moustaki, & Galbraith, 2008, p. 124). The variables *how often friends called youth on the phone in the past 12 months, how often youth did hobbies in the past week,* and *how often youth takes part in e-mail, instant messaging, or chat rooms* coalesce together on the upper range of the first component while the variables *how often youth got together with friends outside of organized activities in the past 12 months* and *how often youth just hang out with friends in the past week* coalesce together on the upper range of the second component (see Figure 3).
Both components had eigenvalues greater than one (2.995 and 1.463) and accounted for a total of 89% of the variance in the optimally scaled items. The first component explained 60% of the total variance while the second component explained 29% of the total variance (see Table 2).

Table 2

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Cronbach's Alpha</th>
<th>Variance Accounted For Total (Eigenvalue)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>.833</td>
<td>2.995</td>
</tr>
<tr>
<td>2.</td>
<td>.395</td>
<td>1.463</td>
</tr>
<tr>
<td>Total</td>
<td>.970</td>
<td>4.458</td>
</tr>
</tbody>
</table>

Figure 3. Component Loadings
Since the two components did not have a clear meaningful interpretation (i.e. it is not clear what aspect of social integration is defined by component one), all of the six variables were recoded into dichotomous items and collapsed into one continuous variable. For example, the variable *how often friends called youth on the phone in the past 12 months* had 5 response options, (1) Never called (2) Rarely called (3) Called less than once a month (4) Called a few times a month (5) Called about once a week. This was recoded as 0 and 1, where 0 represents never called, and 1 represented all the values from two to five. Similarly, the variable *how often youth did hobbies in the past week* had four response options, (1) Not at all (2) 1 or 2 times (3) 3 or 4 times (4) 5 or more times a week. This was also recoded as 0 and 1, where 0 represents not at all, and 1 for all other response options. A composite continuous variable with a range of 0-6 and a mean of 4.99 ($SD$, 1.27) was developed as a measure of institutional experiences associated with social integration.

**Descriptive analyses.** In order to compare the study sample to those excluded from the study on all other categorical variables representing individual and household characteristics, an independent-sample chi-square tests was conducted. Using a cross tabulation table, the chi-square test compares the frequencies of nominal or ordinal data for two samples across two or more subgroups (Crewson, 2006). Each cell in the cross tabulation table is compared to an expected value, which is established by multiplying the row frequency by the column frequency and dividing by the total frequency for the available (Crewson, 2006). The independent-sample chi-square test is frequently used to compare two samples on a response variable that is categorical (Huck, 2004). The independent-sample chi-square test allows for this and other similar comparisons between proportions of youth in the two groups.
To check if the samples that were included were biased, crosstabulation was used to compare the percentage of youth in the primary sample to the percentage of youth who were excluded because they were still enrolled in college or were not enrolled during wave four data collection period. Chi-square an analysis was used summarize the frequency distribution of demographic (age, gender, disability, income, race, language spoken at home and mother’s educational level) and other pre-entry variables (e.g., goals, employment) between the two samples (primary and excluded) with an alpha-level of .05 used to identify significant differences. Results are presented in Table 3 and 4. No statistically significant differences were observed between the primary and the excluded sample with regard to pre-entry variables.

Table 3

Cross-tabulation for Samples and Demographic Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>$\chi^2$</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>44.77</td>
<td>2.837</td>
<td>.084</td>
</tr>
<tr>
<td>Gender</td>
<td>1.28</td>
<td>1</td>
<td>.666</td>
</tr>
<tr>
<td>Mother’s Education</td>
<td>42.29</td>
<td>2.781</td>
<td>.143</td>
</tr>
<tr>
<td>Language spoken at home</td>
<td>0.54</td>
<td>1</td>
<td>.749</td>
</tr>
<tr>
<td>Household Income</td>
<td>26.62</td>
<td>1.990</td>
<td>.146</td>
</tr>
<tr>
<td>Disability</td>
<td>167.68</td>
<td>8.486</td>
<td>.001</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>7.89</td>
<td>3.213</td>
<td>.711</td>
</tr>
</tbody>
</table>

Table 4

Cross-tabulation for Samples and Independent Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>$\chi^2$</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Advocacy</td>
<td>12.19</td>
<td>2.568</td>
<td>.267</td>
</tr>
<tr>
<td>Extra-curricular activities</td>
<td>13.31</td>
<td>1</td>
<td>.181</td>
</tr>
<tr>
<td>Primary goal: Develop vocational skills</td>
<td>2.42</td>
<td>1</td>
<td>.528</td>
</tr>
<tr>
<td>Primary goal: Prepare for PSE</td>
<td>16.33</td>
<td>1</td>
<td>.051</td>
</tr>
<tr>
<td>Employment</td>
<td>0.009</td>
<td>1</td>
<td>.973</td>
</tr>
<tr>
<td>Math in general education setting</td>
<td>8.65</td>
<td>1</td>
<td>.210</td>
</tr>
<tr>
<td>Language arts in general education setting</td>
<td>3.32</td>
<td>1</td>
<td>.402</td>
</tr>
</tbody>
</table>
The primary sample had an average GPA of 2.98 (SD = .69) while the excluded sample had an average GPA of 2.72 (SD = .83). To examine the potential differences in grade point averages between the primary and the excluded sample, an independent sample $t$-test was conducted. This is a commonly used procedure for testing the null hypothesis that two population means are equal. Students in the primary sample had a significantly higher GPA compared to those excluded ($p < .05$).

**Data analytic plan**

Since the research hypotheses focus on predictive relationships, and the outcome measure is coded dichotomously, logistic regression is the appropriate type of analysis (LaValley, 2008; Leech, Barrett, & Morgan, 2005). Previous studies that have used NLTS-2 data to examine predictive relationships in transition research have used logistic regression (e.g., Baer et al., 2003; Chiang et al., 2012; Doren & Benz, 1998). Logistic regression techniques resolve inconsistencies associated with dichotomous dependent data and the assumptions of ordinary sum of squares regression methods (e.g., normally distributed errors). Logistic regression is based on the logit transformation of the dependent variable. The logit transformation generates a continuous logarithmic curve from non-continuous data so that a regression model can be developed. The outcome probabilities for each dependent variable value are the basis for the model. The logit transformation is necessary since dichotomous dependent data violates ordinary least squares assumptions. The first step in model estimation involves transformation of predictor variables through utilization of the maximum likelihood estimation. This is done using the odds ratio. The odds ratio of an event is represented as:

$$\text{Odds}_i = \left[ \frac{P_i}{1 - P_i} \right] = e^{b_0 + b_1 X_1 + \ldots + b_n X_n}$$
where $P_i$ is the probability of an event $i$

The odds ratio portrays the increased or decreased likelihood of an event outcome occurrence. If the odds ratio is less than one, there is a decreased likelihood of an event occurring and if the odds ratio is greater than one then there will be an increased likelihood of the event occurring.

The odds ratio is subsequently converted to a continuous function through the logit transformation. The log of the odds ratio is known as the logit. The logit for each data point is represented by:

$$ \text{Logit}_i = \ln \left( \frac{P_i}{1 - P_i} \right) $$

The maximum likelihood estimation is then used to estimate the coefficients from the logit transformation. The likelihood is the probability that the observed values of the outcome measure will be predicted by the observed predictor variable data. The log likelihood is the log of that likelihood and it is in the range of infinity to negative infinity. The maximum likelihood estimate seeks to maximize the log likelihood value and estimates the coefficient found at that maximum point. The maximum likelihood is determined through an iterative process that will be done using SPSS 20. The logistic regression equation is:

$$ Z = b_0 + b_1 X_1 + b_2 X_2 + \ldots + b_k X_k $$

where $z$ is the log odds of the outcome variable = $\ln$ (odds(event))

where $b_0$ is the constant and where there are $k$ predictor ($X$) variables, some of which may be interaction terms. The "$b$" terms are the logistic regression coefficients, also called parameter estimates.

Logistic regression also functions as a variable selection tool (O’Gorman, & Woolson, 1991). Variable selection is concerned with the strategies for selecting one subset out of a pool of
explanatory variables that is able to explain or predict the response variable well enough, such that all contributions from the variables that remain. The effects of pre-entry factors on PSE completion were examined after controlling for gender, age, disability, income, mother’s education, language spoken at home and ethnicity.

**Mediation analysis.** The causal steps approach (Barron & Kenny, 1986) was used to test the second hypothesis. It was hypothesized that the relationships between pre-entry variables and PSE completion will be mediated by institutional experiences associated with social integration. A series of regression models (Cohen et al., 2003) were used to examine the relationships between the focal independent variables, the proposed mediator and PSE completion, after controlling for the effects of demographic factors. First, pre-entry variables were regressed on institutional experiences after controlling for demographics to examine the link between independent variables and the mediator (institutional experiences). In the second model, institutional experiences were regressed on PSE completion after controlling for demographics and pre-entry variables to examine the relationship between the potential mediator and the outcome measure. Model three included PSE as the outcome measure and pre-entry variables as independent variables after controlling for demographics variables. Using PSE completion as the dependent measure, the fourth model included institutional experiences in addition to pre-entry variables after controlling for demographics. To determine the likelihood of mediation effect of institutional experiences the difference in coefficient values for pre-entry variables from model three to model four for each hierarchical regression predicting PSE completion were examined.

The notion of mediation is hinged on the idea that an antecedent (independent) variable affects a mediating variable, which then affects an outcome variable. This relationship exists because it is established through a causal chain of events in which the independent variable
influences intermediary variables and this effect follows through to the outcome measure. Mediating variables are social, behavioral, psychological, or biological constructs that transmit the effect of one variable to another variable (MacKinnon, Fairchild & Fritz, 2006). For example, self-advocacy may result in increased participation in social activities in PSE, which translates into an increased likelihood of graduation (see figure 4). In this case, participation in social activities is the mediating variable.

Figure 4. Causal step approach

Among the many methods available for testing hypotheses about intervening variable effects, the causal steps approach (Baron & Kenny, 1986) has been the most widely used method (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). The causal steps approach requires researchers to estimate the paths in a model and establish whether certain criteria are met to verify mediation. For example if both $a$ and $b$ paths in a model such as Figure 2 are statistically significant and $c'$ is closer to zero than $c$, then $M$ is deemed a mediator of the relationship between $X$ and $Y$. The causal step is broken down into four steps performed with three regression equations. The first step is to show that there is a significant relation between the predictor and the outcome (see path $c$ in Figure 2). The second step is to show that the predictor
is related to the mediator (see path a in Figure 2). The third step is to show that the mediator (e.g., participation in sports) is related to the outcome variable (PSE completion). This path (b) is estimated, controlling for the effects of predictor variables.

The regression equations include:

\[ Y' = cX + E1 \]
\[ M' = aX + E2 \]
\[ Y'' = bM + c'X + E3 \]

Where \(Y'\) = outcome variable, \(X\) = causal variable, \(M\) the mediator.

The last step is to show that the strength of the relation between the predictor and the outcome is significantly reduced when the mediator is added to the model (compare Path c with Path c’ in Figure 2). If participation in sports is a complete mediator, the relation between self-advocacy and PSE completion will not differ from zero after participation in sports is included in the model. If participation in sports is a partial mediator, which is more likely, the relation between self-advocacy PSE completion will be significantly smaller when participation in sports is included but will still be greater than zero. There are several ways to assess whether the change in the regression coefficient (c to c’) is significant. Since \(c - c'\) is equal to the product of Paths a and b, the significance of the difference between c and c’ can be estimated by testing the significance of the products of Paths a and b (Frazier, Tix, Barron, 2004). This process involves dividing the product of Paths a and b by a standard error term. The mediated effect divided by its standard error yields a \(z\) score of the mediated effect. The causal step approach has been criticized for its lack of power and its dependence on the quantification of the intervening effect (Hayes, 2009). The observation about lack of power has been attributed to challenges such as, the possibility of high correlation between the mediator and the predictor (Frazier et al., 2004).
However, adequate power may be achieved in large sample sizes, often more than 500 (Hoyle & Kenny, 1999; Kenny, Kashy, & Bolger, 1998)

Some advantages have been attributed to mediation analysis in the examination of causal relationships between variables. First, the utility of mediation analysis stems from its ability to go beyond the descriptive to a more functional understanding of the relationships among variables by examining both direct and indirect effects of variables (Preacher & Hayes, 2004). Second, mediation analysis provides evidence on how a specific program achieves some effect by testing the processes by which the program effect on a mediating variable lead to an effect on the outcome variable. Such information may increase the understanding of mechanisms underlying the change in the outcome (MacKinnon & Dwyer, 1993)

**Sampling weights.** Data weighting is a technique used in analysis to adjust data results to overcome sampling bias thereby creating valid point estimates. The NLTS2 was designed to produce results that generalize to (a) the population of youth in the United States in the specified age range (i.e., students who were ages 13-16 in December 2000) who are receiving special education and (b) the population of youth who are in each of the 12 disability categories (Valdes et al., 2009). The stratified selection procedures used in the NLTS-2 did not afford every youth with a disability an equal opportunity to participate. Therefore, it is important to weight data in order to estimate the true values of the entire population. In addition, the weighting procedures also account for the variation in the numbers and characteristics of the respondents observed across different data collection time points. SRI International provides a sample design data file that links each case to information on how cases were selected based on disability category, and region, size, and wealth of the LEA. Using the SPSS Complex Samples module, several analysis plan files were created that generate weighted estimates based on the information in the sample
design data files. The choice of weights for each analytic procedure was based on the instruments from which variables are obtained. The appropriate weight to use when analyzing variables within a single instrument for a single wave is the full weight of the instrument. However, when analyzing variables obtained from multiple instruments or across waves (e.g., comparing demographic data from wave one parent interview and self-advocacy obtained in the teacher survey in wave two) the appropriate weight was taken from the instrument with the smallest sample size.

**Missing data.** The problem of missing data is a common occurrence in survey-based research such as the NLTS-2. Disregarding missing data by using a complete case analysis can produce biased estimates. Biases occur when participants with complete data are systematically different from those with missing data (Carrigan, Barnett, Dobson & Mishra, 2007). Longitudinal studies are especially susceptible to such bias, because missing data accumulates over time. In addition, some sampled elements may not participate in the survey (total non-response) or, a responding sampled element may fail to provide acceptable responses to one or more of the survey items (item non-response). There exist a variety of approaches to compensating for missing data including general-purpose methods of weighting and imputation (Brick and Karlton, 1996). Many of the compensation strategies however, pose challenges. For example, multiple imputation procedures depend on assumptions such as the data must be missing at random, the model used to generate the imputed values must be correct in some sense and the model used for the analysis must match up, in some sense, with the model used in the imputation. The problem is that it is easy to violate these conditions in practice and little can be done about data that are not missing at random (Rubin, 1996)
The choice of compensation strategy should be informed by the source of missing data (Brick & Karlton, 1996). Missing data arising from total unit non-response, which occurs when no survey data are collected from an element (persons surveyed) for the sample, may be compensated for by means of weighting adjustments in which respondents are assigned greater weight in the analysis in order to represent the non-respondents. In the current study, weighting procedures discussed above will be used. In some cases, data may be missing due to item non-response, which occurs when a sampled element participates in the survey but fails to provide acceptable responses to one or more of the survey items. In cases where the investigation involves univariate analysis and computation is restricted to records with items in question, the amount of bias may be small. However, the questions in this study require multivariate analysis and low item non-response rates for several items together may result in a sizable proportion of records with missing data for one or more items included in the analysis. The cases with missing data may therefore be dropped either through listwise or pairwise deletion. Deleting cases with missing items has the potential of drastically reducing sample size, reducing power, differing sample sizes for each analysis and biased parameter estimates (McKnight, McKnight, Sidani, & Figueredo, 2007). The usual form of compensation for item non-response is imputation (Brick & Karlton, 1996). By assigning values to the missing responses, imputation enables all relevant responses to be included in every analysis. The deductive imputation approach was used in this study. Deductive imputation is used when missing responses can be deduced from responses to other items (Brick & Karlton, 1996). The NLTS-2 database used in this study contains responses from multiple surveys, some of which ask the same questions at different time points. It is therefore possible to deduce a missing item based on the same participant’s response on a previous wave. For example, in wave two-program survey, the variable \(npr2A3a_1\)
Instructional settings for language arts (if received): General education classroom provides data on whether or not a student received language arts instruction in the general education setting. Similarly, in wave one program survey, the variable (npr1A3a_1) Instructional settings for language arts (if received): General education classroom provides the same information. Therefore, if the response to this item is missing in wave two it is possible to deduce its value by obtaining the response in wave one.

Implications of the study

Due to the limited amount of research on third variables involved in the prediction of PSE completion for youth with disabilities, this study has the potential to offer useful findings to researchers, policy makers and practitioners. The findings of this study may provide clarity on the effectiveness or lack of effectiveness of the current transition requirements in IDEA such as transition goals, and the need for students to experience general curriculum in inclusive settings. The implications of some requirements of IDEA have not yet been fully understood especially with regard to PSE completion. Though it is important for practitioners and policy makers to consider the importance of the pre-entry variables such as participating in extra curricular activities, and challenges that come about as a result of by disability status, household income, and parental level of education, such considerations should be made in the context of PSE experiences that are known to influence completion. This study has the potential to offer insight into how PSE experiences related to social integration mediate relationships between pre-entry variables and PSE completion. Gaining such insight would assist students and practitioners in making decisions about college choice and how to better prepare for success. Knowledge gained from this study may also inform policies guiding transition planning and support for students with disabilities in PSE.
Chapter 4

Findings

The purpose of this study was to determine the antecedent conditions (i.e. pre-entry attributes and experiences) that contribute to PSE completion for students with disabilities, taking into account institutional experiences associated with social integration. Previous studies have supported the influence of pre-entry variables (e.g. gender and high school academic performance) and institutional experiences on PSE completion for students with disabilities. Considering this body of research, it was hypothesized that pre-entry variables would predict PSE completion. In addition, it was hypothesized that the relationships between pre-entry variables and PSE completion would be mediated by institutional experiences associated with social integration. To explore these relationships, mediation analysis based on the causal step approach (Baron & Kenny, 1986) was conducted. Regression models were developed for each of the four steps. The results are presented in order of the two research hypotheses.

**Hypothesis 1:**

Pre-entry variables (high school achievement, self-advocacy, post-school goals, high school academic courses, participation in extra-curricular activities, and participation in employment) predict PSE completion.

Logistic regression analysis was used to examine the effects of pre-entry variables on PSE completion for students with disabilities. Results of the chi-square analysis of all the pre-entry variables selected for this study indicated that both mother’s level of education and language spoken at home were significantly related to ethnicity. White students were more likely
to come from homes in which only English was spoken compared to non-white students ($\chi^2 = 92.38, p < .001$). Non-white students were more likely to have parents with less that a high school diploma compared to white student ($\chi^2 = 52.20, p < .001$). Additionally, students who received language arts instruction in general education were more likely to receive math instruction in general education ($\chi^2 = 19.66, p < .001$). Frequency distribution indicated that the variable “received language arts in general education had more valid cases compared to received math in general education. Based on these findings, mother’s level of education, language spoken at home and receiving math in general education were excluded from the final model.

The results of the analysis, including $R^2$, along with Walds $F$, odds ratios, confidence intervals, and $p$-values, for the predictor variables are presented in Table 5. The combination of 12 pre-entry variables (age, ethnicity, disability, income, gender, self-advocacy, language arts, employment, extra-curricular activities, PSE goal, vocational goal, and high school GPA) significantly predicted PSE completion ($Walds F = 2.915, df = 15, n = 313, p < .001$). The model correctly predicted 91.4% of youth who did not complete post-secondary education, and 81.4% of youth who completed post-secondary education and 87.4% of all cases. Additionally, the pre-entry variables in the regression model accounted for 70% ($R^2 = .700$) of the variance in PSE completion. Four variables significantly predicted PSE completion for students with disabilities. Holding other variables constant, students who provided input in IEP meetings without taking leadership roles were less likely to receive a diploma, certificate or license from PSE institutions compared to those who assumed leadership roles ($p < .05, OR = .11$). Holding all other variables constant, students who participated in work-study or paid work while in high school were more likely to complete PSE compared to those who did not participate in work-study or employment ($p < .01, OR = 75.19$). Controlling for other factors, youth who participated in extra-curricular
activities were less likely to report PSE completion compared to those who did not participate in extra-curricular activities (\( p < .05, \text{OR} = .02 \)). Youth whose primary transition goal was to develop vocational skills were less likely to complete PSE compared to youth who did not have vocational skills as a primary goal (\( p < .05, \text{OR} = .02 \)).

Table 5

*Logistic Regression Analysis for Predictors of Post-secondary Education Completion (Disabilities)*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Walds F</th>
<th>df</th>
<th>OR</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disability</td>
<td>2.285</td>
<td>3</td>
<td>-.</td>
<td>.082</td>
</tr>
<tr>
<td>Speech Impairment Vs. LD</td>
<td>-</td>
<td>-</td>
<td>122.84</td>
<td>-</td>
</tr>
<tr>
<td>OHI vs. LD</td>
<td>-</td>
<td>-</td>
<td>45.96</td>
<td>-</td>
</tr>
<tr>
<td>Other vs. LD</td>
<td>-</td>
<td>-</td>
<td>6.77</td>
<td>-</td>
</tr>
<tr>
<td>Age</td>
<td>1.873</td>
<td>3</td>
<td>-.</td>
<td>.137</td>
</tr>
<tr>
<td>15 years vs. 13 to 14</td>
<td>-</td>
<td>-</td>
<td>10.52</td>
<td>-</td>
</tr>
<tr>
<td>16 years vs. 13 to 14</td>
<td>-</td>
<td>-</td>
<td>0.90</td>
<td>-</td>
</tr>
<tr>
<td>17 years vs. 13 to 14</td>
<td>-</td>
<td>-</td>
<td>0.13</td>
<td>-</td>
</tr>
<tr>
<td>Ethnicity: Non-White vs. White</td>
<td>3.056</td>
<td>1</td>
<td>9.67</td>
<td>.083</td>
</tr>
<tr>
<td>Income:</td>
<td>1.246</td>
<td>2</td>
<td>-.</td>
<td>.291</td>
</tr>
<tr>
<td>$25,001- $50,000 vs. less than $25,000</td>
<td>-</td>
<td>-</td>
<td>17.93</td>
<td>-</td>
</tr>
<tr>
<td>Over $50,000 vs. Less than $25,000</td>
<td>-</td>
<td>-</td>
<td>21.63</td>
<td>.477</td>
</tr>
<tr>
<td>Gender</td>
<td>1.246</td>
<td>1</td>
<td>2.0</td>
<td>.266</td>
</tr>
<tr>
<td>Self-Advocacy:</td>
<td>4.701</td>
<td>2</td>
<td>-.</td>
<td>.011</td>
</tr>
<tr>
<td>Did not attend or was present without input</td>
<td>-</td>
<td>-</td>
<td>0.17</td>
<td>-</td>
</tr>
<tr>
<td>vs. Took leadership role</td>
<td>-</td>
<td>-</td>
<td>.11**</td>
<td>.006</td>
</tr>
<tr>
<td>Provided some input vs. Took</td>
<td>-</td>
<td>-</td>
<td>.11**</td>
<td>.006</td>
</tr>
<tr>
<td>leadership role</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade Point Average</td>
<td>0.018</td>
<td>1</td>
<td>1.1</td>
<td>.892</td>
</tr>
<tr>
<td>Employment</td>
<td>14.039</td>
<td>1</td>
<td>75.19**</td>
<td>.001</td>
</tr>
<tr>
<td>Language Arts</td>
<td>3.138</td>
<td>1</td>
<td>0.18</td>
<td>.079</td>
</tr>
<tr>
<td>Primary goal: Prepare for PSE</td>
<td>1.222</td>
<td>1</td>
<td>2.36</td>
<td>.479</td>
</tr>
<tr>
<td>Primary goal: Develop vocational skills</td>
<td>4.901</td>
<td>1</td>
<td>0.02*</td>
<td>.028</td>
</tr>
<tr>
<td>Participated in any extra-curricular activities</td>
<td>5.013</td>
<td>1</td>
<td>0.02*</td>
<td>.027</td>
</tr>
</tbody>
</table>

*Note. * significant at .05 level (\( p < .05 \)). ** significant at .01 level (\( p < .01 \))., OHI= Other Health Impairments, LD = Learning disabilities*
Hypothesis 2:

Holding demographic factors constant, the relationships between the pre-entry variables and PSE completion will be mediated by institutional experiences associated with social integration.

To test this hypothesis, Baron and Kenny’s (1986) application of regression was used. This procedure involved a three-step approach:

1. Regress the mediator onto the independent variable (IV) to show that it is possible that the two variables can be causally linked (Path $a$);
2. Regress the dependent variable (DV) onto the IV to show that this causal relationship is also probable (Path $c$); and
3. Regress the DV simultaneously onto the IV and the mediator to show that the mediator is related to the DV, even when the IV is statistically controlled (Path $c'$).

The hypothesis of a mediation is supported because paths $a$ and $b$ account for a significant proportion of the effect of the independent variable on the outcome measure.

Path a. The first step in the causal step approach was to determine whether the independent variables are significantly related to the potential mediator. A regression model was developed to estimate the direct effects of the pre-entry variables on institutional experiences associated with social integration. All the demographic variables and self-advocacy were recoded and entered into the model as dichotomous variables. Significant predictors of institutional experiences associated with social integration included annual household income and gender. The relations among these variables are presented in Table 6. Holding other variables constant, male students had lower scores on institutional experiences associated with social integration ($p < .05$, $\beta = -4.11$). With all the pre-entry variables held constant, youth who came from families...
whose annual incomes were less than $50,000 had higher scores on institutional experiences associated with social integration ($p < 0.05, \beta = 4.57$).

Table 6

Regression Analysis for Predictors of Institutional Experiences associated with social integration (path a)

<table>
<thead>
<tr>
<th>Variable</th>
<th>$\beta$</th>
<th>Walds F</th>
<th>df</th>
<th>t</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.538</td>
<td>0.102</td>
<td>1</td>
<td>0.659</td>
<td>.749</td>
</tr>
<tr>
<td>Disability</td>
<td>-1.345</td>
<td>0.499</td>
<td>1</td>
<td>-0.707</td>
<td>.481</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>-1.014</td>
<td>0.237</td>
<td>1</td>
<td>-0.487</td>
<td>.627</td>
</tr>
<tr>
<td>Gender</td>
<td>-4.114*</td>
<td>6.691</td>
<td>1</td>
<td>0.747</td>
<td>.111</td>
</tr>
<tr>
<td>Household Income</td>
<td>4.566*</td>
<td>4.828</td>
<td>1</td>
<td>2.197</td>
<td>.029</td>
</tr>
<tr>
<td>Self-Advocacy</td>
<td>2.975</td>
<td>1.566</td>
<td>1</td>
<td>2.705</td>
<td>.131</td>
</tr>
<tr>
<td>Grade Point Average</td>
<td>1.848</td>
<td>0.769</td>
<td>1</td>
<td>0.877</td>
<td>.382</td>
</tr>
<tr>
<td>Language Arts</td>
<td>1.308</td>
<td>0.153</td>
<td>1</td>
<td>0.391</td>
<td>.696</td>
</tr>
<tr>
<td>Employment</td>
<td>0.350</td>
<td>0.044</td>
<td>1</td>
<td>0.209</td>
<td>.835</td>
</tr>
<tr>
<td>Primary goal: Prepare for post-secondary education</td>
<td>-1.131</td>
<td>0.256</td>
<td>1</td>
<td>-0.506</td>
<td>.641</td>
</tr>
<tr>
<td>Primary goal: Develop vocational skills</td>
<td>2.774</td>
<td>1.436</td>
<td>1</td>
<td>1.198</td>
<td>.233</td>
</tr>
<tr>
<td>Participated in any extra-curricular activities</td>
<td>3.509</td>
<td>1.352</td>
<td>1</td>
<td>1.163</td>
<td>.247</td>
</tr>
</tbody>
</table>

* significant at .05 level ($p<.05$). ** significant at .01 level ($p<.01$)

Paths b and c’

The second step involved showing that the potential mediator is significantly related to the outcome measure, holding other independent variables constant. A regression model was developed to examine the odds of graduation for students who participated in institutional activities associated with social integration. In this model, institutional experiences associated with social integration was not significant ($p = .924$, OR: 2.1). In order to proceed with mediation analysis, Baron and Kenny’s (1986) causal steps approach requires that the relationship between the proposed mediator and the outcome measure be significant. This requirement was not satisfied (i.e., institutional experiences associated with social integration do not serve as a mediating variable). Therefore, the third step involving $c-c'$ was not conducted.
Chapter 5

Discussion

The purpose of this study was to explore the antecedent conditions that contribute to PSE completion for students with disabilities, taking into account institutional experiences associated with social integration. Chapter 4 summarizes the results from the regression analysis used to test the first and the second hypotheses. The first research hypothesis considered the direct effects of pre-entry variables on PSE completion. The second hypothesis considered institutional experiences associated with social integration as mediators in the relationship between pre-entry variables and PSE completion. To estimate the strength of the association between the independent variables, the proposed mediator, and the outcome measure (PSE completion), Nagelkerke $R^2$, statistical significance, and odds rations were considered. This chapter discusses the conclusions derived from the results. First presented is a discussion of the major findings with respect to the relevant literature. Second, this study’s limitations, implications for practice, policy, and opportunities for further research are discussed.

Major Contributions

The current study offers several contributions to improve our understanding of factors that influence PSE completion for learners with disabilities who enroll in vocational programs as well as two and four-year colleges. This study used prospective, longitudinal data based on a nationally representative sample of students to examine the relationships between pre-entry variables, and PSE completion. In addition, the potential mediating effect of institutional experiences associated with social integration was examined. The student and family
characteristics as well as the school experiences were obtained from parent and teacher surveys conducted in waves one and two. Measures of institutional experiences associated with social integration were obtained in wave four during which all the participants reported being enrolled in PSE.

**Effects of Pre-entry Variables on PSE Completion.** This study identified several patterns of relationships between four pre-entry variables (self-advocacy, extra-curricular activities, vocational transition goal, and employment), and PSE completion for students with disabilities who were enrolled in PSE programs after completing high school. This study further probed the relationships between pre-entry variables and institutional experiences associated with social integration. These relationships were examined on the basis of the student integration framework (Tinto, 1975, 1987, 1993), which proposes a causal sequence of events leading up to departure from PSE institution. Since this study was non-experimental, causal claims may not be justified. However, the understanding of the influence of pre-entry variables on PSE completion and institutional experiences associated with social integration may offer guidance to researchers, and practitioners in making decisions about relevant components of the transition process.

**Self-advocacy and PSE completion.** In this study, self-advocacy was measured as a function of the roles students play in IEP meetings. Past research shows that self-advocacy skills play an important role in PSE outcomes for students with disabilities. The current study showed that youth who provided input in IEP meetings without taking leadership roles were significantly less likely to complete PSE compared to peers who took leadership roles in IEP meetings. The finding that self-advocacy positively influences PSE completion is consistent with previous research that shows self-advocacy skills contributes to PSE success (Barber, 2012). Wagner,
Newman, Cameto, Javitz, and Valdes (2012) noted that student participation in transition planning is an opportunity for students to learn and demonstrate self-determination skills; a process whereby students make choices, act on those choices, experience the results, and then make new choices (Agran & Hughes, 2008, p. 69). However, less than 12% of the students included in this study took leadership roles in their IEPs. The finding that a small proportion of students play an active role in IEP meetings is consistent with past research showing that, although more students may be attending meetings, few actively participate (Martin, Van Dycke, Greene, et al., 2006; Mason, Field, & Sawilowsky, 2004). It is likely that many of the students with disabilities who desire to attend PSE are not well prepared to assume leadership roles in IEP meetings. Past research shows that without direct instruction regarding meeting purposes and procedures, students participate relatively little (Martin et al., 2006; Mason, McGahee-Kovac, Johnson, & Stillerman, 2002).

Although the results of this study indicate that students who assume leadership roles in their IEP meetings have higher PSE completion rates than those who were present at the meetings but did not participate, no explanation can be asserted from these results alone. Instead, future research should be designed to clarify how this leadership role impacts PSE outcomes, to identify very specific implications for policy and practice. Some possible questions to explore could include whether the experience of leading one’s IEP meeting impacts the development of skills that make PSE completion more likely (such as advocating for appropriate accommodations and curricular modifications related to one’s disability). If this is the case, further research could explore whether other ways that students are taught self-determination skills have a similar positive result on PSE completion. In addition to the impact of the leadership experience itself, further research could also explore whether there are other
differences between the students who are provided the opportunity to lead their IEP meetings and those who do not. This would help the field understand whether there are other factors that impact PSE completion and the leadership of the IEP meeting just happens to be another result of those other factors. Those could include such things as academic preparation, an outgoing personality, teacher expectations, and/or parent involvement? Lastly, a combination of student characteristics and the impact of the leadership opportunity could be working together to provide the associated improvement in PSE completion rates. Without such research to clarify a causal implication, it is difficult to state definitely the implications for practice.

Employment and PSE completion. Students who participated in work-study or paid employment were 75 times more likely to report completing PSE compared to those who did not. Just as with leadership of the IEP process, a more complete understanding of the impact of work-study or paid employment on PSE completion requires further research, particularly for students with disabilities. Much of the research that has been done about the link between work-study, paid employment and post-school outcomes has been done with students without disabilities. This body of research suggests that engagement in employment can be a risk factor with regard to academic performance and school completion (Bechman, Staff, O’Malley, & Freedman-Doan, 2013). Questions remain about whether paid employment also negatively impacts academic performance for students with disabilities. Furthermore, school based work-study programs and paid employment may represent similar but different experiences. For example, some school based work-study programs provide formal or informal skill certification, unlike many paid employment opportunities. The certifications offered through such programs could explain the high PSE completion rates. Besides, some high school programs that focus on preparing students who expect to enroll in PSE require work-study participation (Daviso et al., 2011).
Consequently, students who participate in such college preparation programs may be better prepared for PSE.

In addition, participation in community-based work-study can provide actual or simulated job experience that can be useful in making career choices and developing skills (e.g., motivation, social skills) that are valuable in other post-school environments such as PSE. Burgstahler (2001) found that among students with disabilities who participated in school-based work experiences, there was an increase in individuals’ motivation to study and work toward a career, a greater understanding of the skills needed to succeed in job tasks (including those necessary to work effectively with other co-workers and supervisors) and better knowledge of specific career interests. Given that the variable used to measure employment considered work-study and paid employment as equivalent, it may not be possible to ascertain the exact influence of either work-study or employment at this time.

It is important to note that the majority (55%) of the students who reported participating in work-study or paid employment enrolled in post-secondary vocational programs. Past research has shown that, compared to two- and four-year colleges, program completion is higher in post-secondary vocational programs. For example, Newman et al. (2011) found that students with disabilities who attended post-secondary vocational, business, or technical schools were more likely to complete their programs than were those who enrolled in four-year colleges (57% vs. 34%). It is likely that the high completion rates among students who participated in work-study or paid employment are explained by the PSE settings in which students are enrolled. The finding that early work experiences influence PSE completion underscores the importance of providing students with opportunities to engage in work-study and employment while in high school, particularly for students who intend to matriculate in vocational programs.
Extra-curricular activities and PSE completion. Students who participated in extra-curricular activities were less likely (OR: .02) to report completing a PSE program. This finding was contrary to what was expected, based on prior research on PSE completion (Tinto, 1975, 1987, 1993) This research demonstrated that participation in extra-curricular activities has a positive impact on PSE outcomes. A recent report published by the Government Accountability Office (GAO, 2010) underscored that access to, and participation in, extracurricular athletic opportunities afford important health and social benefits to all students, particularly those with disabilities. These benefits can include socialization, improved teamwork and leadership skills, and fitness. It is unlikely that participating in extra-curricular activities is a risk factor. There can be a number of possible explanations for this discrepancy, and future research should explore this in more detail. For example, it is important to understand whether specific extra-curricular activities have a great impact on PSE outcomes and whether students with disabilities are less likely to participate in those types of experiences than students without disabilities. Or, it is also possible that those specific extra-curricular activities might not have been included in the variables collected through the NLTS-2 study. It is also possible that there are skills and/or resources that students without disabilities learn or access through their participation in extra-curricular activities that students with disabilities are not learning or accessing. For example, we know that youth without disabilities learn a number of social skills by observing others that youth with disabilities may need direct instruction to acquire (Carter et al., 2011). Lastly, this study included students enrolled in a range of different PSE settings and the impact of participation in extra-curricular activities on PSE completion may vary based on the setting and/or for those who transfer from one setting to another. Future studies should disaggregate the data based on the type of setting and nature of the disability.
Further, it is necessary to examine the impact of extra-curricular activities on PSE completion more directly with quantitative measurements, beyond the interpreted results of surveys or self-reports. Questions remain about whether students with disabilities who participated in extracurricular activities during their high school career experienced different PSE completion rates than their peers who had similar transition goals, enrolled in similar PSE settings but were not involved in such activities. In other words, schools invest manpower and other resources in support of extracurricular activities in an effort to foster student success; therefore, it is necessary to assess if such interventions actually enhance student PSE outcomes.

*Developing vocational skills and PSE completion.* Students whose primary transition goal was to develop vocational skills were less likely (OR: .02) to report completing a PSE program. It is likely that students whose transition experiences focused on developing vocational skills may meet the vocational goal of obtaining employment without necessarily attaining exit credentials in PSE. Additionally, the majority of students who focused on developing vocational skills were identified with ID or autism, groups that historically have some of the worst post-school outcomes in the areas of PSE and employment. Although no significant differences were associated with disability in PSE completion, descriptive analysis showed that 73% of students with ID and 65% of students with autism had not completed a PSE program by the end of the study. Furthermore, students who focus on vocational skills may be less prepared for the academic components of PSE. Future research should examine the academic components of the transition experiences of students whose transition plans are centered on developing vocational skills.
Institutional Experiences Associated with Social Integration

**Gender.** Estimates of direct effects of pre-entry variables on institutional experiences associated with social integration indicated that gender and household income significantly predicted institutional experiences associated with social integration. Male students had significantly lower scores on the measure for institutional experiences associated with social integration. This finding indicated that compared to female students, male students were less engaged in social activities, communicated less with friends over the phone, spent less time together with friends outside of organized activities, and seldom took part in e-mail, instant messaging, or chat rooms. This conclusion may be examined from the perspective of gender role theory, which emphasizes that, males and females experience different socialization practices (Reevy, 2007). Gender role theory proposes that females are better prepared for social relationships and are socialized to desire and need social relationships more than males (Deaux and LaFrance, 1998). Therefore it is not surprising that the females in this study had higher scores on institutional experiences associated with social integration compared to males.

**Annual family income.** Students whose annual family incomes were less than $50,000 a year had significantly higher scores on the institutional experiences associated with social integration. Families that reported annual incomes less than $25,000 and those who reported annual incomes ranging from $25,001 to $50,000 were combined in the process of dichotomizing the income variable. Thus, it is not clear which of the two groups this finding applies to or, whether the finding applies to both groups. Future studies should further explore the influence of family income on institutional experiences associated with social integration. These findings are important because they offer additional insight into factors that affect students’ ability to engage in activities associated with social integration.
Mediator analysis

The regression model examining the effects of the proposed mediator on PSE completion indicated that an increase in scores on institutional experiences associated with social integration corresponds to an increase in the odds of completing PSE holding other factors constant. However, this relationship was not statistically significant. Therefore, the institutional experiences considered in this study did not satisfy the second requirement of the causal step approach (Baron and Kenny’s (1986). This finding suggests that institutional experiences considered in this study affect PSE completion. However, it is unlikely that institutional experiences such as receiving invitation to social activities, hanging out with friends, and getting together with friends outside organized activities account for the observed relationships between pre-entry variables and PSE completion.

A possible explanation for this finding relates to differences in measures of the construct of social integration. Previous studies have indicated that social integration significantly predicts PSE persistence behavior (DaDeppo, 2009; Mamiseishvili & Koch, 2012). The instruments used to measure social integration in these studies focused on psychological measures of social integration (i.e., students’ subjective feelings of fit). For example, DaDeppo (2009) used The Freshman Year Survey (FYS; Milem & Berger, 1997) to measure social integration. The items on the social integration subscale in this instrument require students to indicate on a four-item Likert scale whether they feel they have developed close and personal relationships. Similarly, Shepler and Woosley (2012) used a scale which included questions such as; On this campus, to what degree are you connecting with people who... (a) share common interests with you? (b) include you in their activities? (c) you like? In the current study, behavioral indicators of social integration were examined. The behavioral measures of social integration examined in this study
may influence PSE completion, however, it is likely that such experiences neither lead to feelings of fit nor significantly affect PSE completion for students with disabilities.

**Non-significant findings**

**GPA and PSE completion.** Previous research (Wessel et al., 2009) indicated that PSE graduation rates for students with disabilities with high SAT scores were significantly higher compared to peers with lower scores. A similar trend was observed in the current study. Students with high GPAs had higher completion rates, however, this finding was not statistically significant. No explanation for this finding can be asserted within the scope of the current study alone. However, it is likely that for students with disabilities, SAT scores provide a better indicator of PSE readiness as compared to GPA. High school GPA and SAT scores differ in some important ways. For example, SAT scores are standardized tests scored by a third party while GPAs are not standardized and can be influenced by teachers. It may be the case that high school GPAs do not reflect students’ true potential. Additionally, past research has shown that SAT scores and high school grades combined provide the best prediction of college graduation, (Camara & Echternacht, 2000). Future research should be conducted to clarify the impact of GPA on PSE outcomes.

**Gender and PSE completion.** Previous research has shown that female students are more likely to complete PSE compared to male students (O’Neill et al., 2012; Wessel et al. (2009). In the current study, female students had higher PSE completion rates compared to male students. Though not significant, this pattern of association between gender and PSE completion was in the expected direction. The lack of statistical significance may be explained by the decision to include students who enrolled in vocational programs in the primary sample. Previous studies that have found a significant association between gender and PSE completion
were based on students attending two and four-year colleges. Additionally, past research (Wessel et al., 2009; Richardson, 2009) has shown that the proportion of female students with disabilities enrolled in PSE is higher than that of male students. Data from the National Center for Education Statistics (NCES, 2012) also shows that the proportion of female students who report having disabilities in college is higher (57.3%) than that of male students who report having disabilities. In this study, only 37% of the participants were female. Given the differences in proportions of female students across past and current study, a non-significant relationship between gender and PSE is conceivable. Additional research should be designed to explain the relationship between gender and PSE outcomes.

**Age and PSE completion.** O’Neil et al., (2012) and Richardson (2009) found that older students with disabilities have significantly higher completion rates. The relationship between age and PSE completion in the current study was not statistically significant. Older students in the current study had higher PSE completion rates compared to younger peers. However, this trend was observed only between students who were 15 years old compared to peers who were 13 to14 years old at the beginning of the study. The studies that identified age as a significant predictor of PSE completion did not control for many of the pre-entry variables (e.g., self-advocacy, instructional setting, transition goals) considered in this study. Therefore, it is likely that older students who report completing PSE may have had comparatively more opportunities to complete PSE, hence the higher completion rates. In addition, the influence of age highlights the need to investigate whether timing of PSE enrollment affects the likelihood of completion. Future studies should investigate whether enrolment in PSE immediately after high school or after a longer period has an impact on completion.
**Additional demographics.** Past research has shown that student and family characteristics (e.g., ethnicity, disability, and household income) are associated with PSE enrollment (Chiang et al., 2012). In the current study, students’ ethnicity, disability, and household income were not associated with variation in the likelihood of PSE completion when other pre-entry variables were held constant. This finding is not necessarily in conflict with past research. PSE enrollment and PSE completion are different outcomes, thus, it may be the case that factors affecting PSE enrollment such as ethnicity, disability and family income have little influence on completion rates. Therefore, other factors such as self-advocacy, transition goals, and participation in work-study may play a greater role in the prediction of the likelihood of PSE completion compared to ethnicity, disability, and household income.

**PSE transition goal.** Similarly, past research has shown that transition goals related to PSE predict enrollment (Chiang et al., 2012). In the current study, primary transition goals related to PSE did not significantly predict PSE completion. However, PSE completion rates were higher for students whose primary goal was to enroll in PSE compared to students who did not have this goal. While this pattern of results is in the direction of support for PSE completion, no explanation can be asserted from these results alone. A possible question to explore could include whether the students whose primary transition goal focus on PSE participation are adequately prepared for success in PSE. If this is the case, further research could explore the transition activities and experiences addressed in the transition plans for students who desire to enroll in PSE. The findings related to the PSE transition goal should be interpreted with caution given that many students in this study had missing values on this variable.

**Limitations**

Conclusions presented here should be interpreted in light of the limitations of this study.
First, this study involved a secondary analysis of data from an existing study. Decisions regarding variables to include in this study were made based on availability of variables measured in the NLTS-2 and the perceived match with the constructs discussed in Tinto’s (1975, 1987, 1993) student integration model. The variables included in this study were not always measured in an ideal manner. This limitation specifically relates to the measurement of institutional experiences associated with social integration. There was often little choice in the variables that could be utilized in defining students’ social experiences in PSE. Additionally, the large scope of the NLTS2 meant that there was often limited depth in the questions asked about particular experiences. It is also important to note that the sample included students who enrolled in a variety of PSE settings. It is likely that the pre-entry variables examined in this study have different implications for students enrolled in different PSE settings. Therefore, the lack of statistical significance for some of the independent variables may be explained in part by the effect of PSE setting. Third, statements of causality may not be drawn from this study. This is because the original study did not involve experimental manipulation of any of variables examined. The NLTS-2 was designed to describe the experiences of youth with disabilities as they transitioned to adulthood.

**Opportunities for Future Research**

This exploratory study focused on understanding factors that affect PSE completion for students with disabilities. Specifically, this research sought to gain familiarity with potential predictors of PSE completion and acquire new insight into the influence of constructs defined in the student integration model (Tinto, 1975, 1987 1993). Key findings from this investigation provide grounds for exploring several variables that were found to be promising in the prediction
of PSE completion for students with disabilities who enroll in vocational programs as well as two- and four-year colleges.

Future research should focus efforts on understanding the relationship between forms of student involvement in the IEP process, and PSE outcomes to ascertain the impact of active participation, opportunities for increased involvement, and potential barriers. Research suggests that students are increasingly attending IEP and transition planning meetings (Test et al., 2004). However, little is known about the potential causal relationship between forms of involvement in the IEP process and PSE outcomes. The body of research on family and student involvement in educational and transition planning shows that both school and student level factors appear to play important parts in the forms of student involvement. Wagner et al. (2012) found that students whose schools provided instruction focused on providing students with the knowledge and skills to participate effectively in their own transition planning were more likely to put the knowledge and skills to work by attending IEP/transition planning meetings and taking an active role in them. Furthermore the students’ skill level, and demographics influenced forms of participation in IEP meetings independent of the nature of their disability. Students who spent a greater percentage of their instructional time in general education classrooms were more likely to participate actively in the IEP/transition planning processes. Given the complex relationships between student demographics, school level factors, and post-school outcomes, experimental research examining causal relationships between student’s roles in the IEP process and PSE outcomes would be highly desirable.

Similarly, future research should explore additional opportunities to support student self-advocacy. Exploratory studies should be conducted to identify settings and experiences that could potentially offer alternative opportunities for students to practice communicating their
needs succinctly and making informed decisions. Additionally, the focus on alternative opportunities for development of self-advocacy skills may explicate the roles high school teachers, guidance personnel, and parents play in the development of self-advocacy skills for students with disabilities who desire to matriculate in PSE.

Future research should examine the relationship between PSE success and high school work-study or paid employment to provide a more in-depth understanding of the nature and benefits of these activities to students who desire to enroll in PSE. Past research shows that in work-based learning activities, students apply academic and vocational skills and knowledge to real work situations as they develop the attitudes, values, problem-solving skills, and behaviors that help them become informed citizens and productive workers (Burgstahler, 2001). Presently, it is not clear whether the skills and attitudes the students acquire through work-based learning experiences impact PSE outcomes. In addition, it is important to identify approaches and strategies for implementing work-based learning experiences that have the potential to successfully provide career preparation and support for precollege and college students who have disabilities.

Future research should examine the PSE experiences of male students with disabilities in PSE. Evidence from this study suggests that the PSE completion rates for male students with disabilities were lower compared to female students with disabilities. This study showed that in addition to the comparatively lower completion rates, male students with disabilities are significantly less likely to be involved in institutional experiences associated with social integration. At this time, it is not clear whether the limited involvement in institutional experiences associated with social integration explains the low completion rates. Additional research should be conducted to examine the relationship between institutional experiences
associated with social integration and PSE success for male students with disabilities. Past research shows that for students in general, social integration plays a larger role in PSE success for female students compared to male students. Jones (2010) found that, after controlling for other factors, the impact of social integration on students’ subsequent institutional commitment was conditional on gender. Male and female students had different reactions to social integration and social support.

Future research should explore social experiences of PSE students with disabilities in greater detail to provide insight into what constitutes these experiences and whether the experiences impact PSE outcomes for students enrolled in a variety of colleges. Results showed that it is unlikely that the institutional experiences considered in this study mediate the relationships between pre-entry variables and PSE completion. Therefore it is important to further explore the mechanisms by which additional institutional experiences including social integration as defined by students’ feelings of fit/belonging, potentially influence the relationships between pre-entry variables and PSE completion. Tinto’s (1993) students integration model incorporates a wide variety of institutional experiences related to social integration including relationships with faculty and staff.

The non-significant findings of the present study may suggest a need to distinguish PSE students with disabilities based on the type of college or program they enroll in. Some of the non-significant variables such as gender, and age have been found to be significant in studies focusing on two and four-year colleges. In the current study, these variables were in the expected direction but were not statistically significant. Thus, the findings did not necessarily invalidate past research. Future research should account for the effect of PSE setting in further examination of independent variables included in this study.
Recommendation for practice

Though provisional, findings from this study suggest several courses of action for transition personnel and practitioners who work with students with disabilities who plan to transition to PSE settings. First, it is important for practitioners to note that PSE success depends on a combination of many factors, and that preparation for success at the PSE level depends on more than academic preparation. This analysis of NLTS-2 data suggests that transition experiences that address self-advocacy, work-study or paid employment, academic achievement and transition goals related to PSE have the potential of improving PSE outcomes for students with disabilities.

In line with the conclusions drawn above, IEP teams should carefully consider choices regarding transition goals, given that such goals have serious implications for PSE outcomes. Prior research identified a greater likelihood of PSE completion when students had a primary goal of postsecondary education, but this study did not have a similar finding. It did, however, find that the data trended in this direction, indicating that while not significant, transition teams should pay attention to the goals listed in the IEP document, as well as student plans for the future. It appears that goals impact their attainment.

Active participation in IEP meetings was linked to improved PSE completion rates. This finding has implications for school systems as they help students with disabilities and their families to navigate transition to PSE. Schools should make efforts to train teachers to identify opportunities for teaching self-advocacy skills throughout the school day, collaborate with parents in supporting self-advocacy outside of school, and help students take the responsibility for monitoring progress on their transition plan, all critically important steps in supporting student leadership in IEP meetings. Leading an IEP meeting provides a real opportunity for
students to learn and practice critical self-determination skills, as well as many other related skills that contribute to PSE success. There is a growing collection of curricular materials that teachers can use to promote student-led IEPs (Test, Karronen, Wood, Browder, & Algozzine, 2000), as well as strategies they can use to encourage students to play an active role in IEP meetings (Hawbaker, 2007). The finding that institutional experiences associated with social integration positively influenced overall success in PSE highlights the need for transition personnel to consider improvement of social skills as an aspect of preparation for PSE. For this reason, social skills assessments and instruction should be considered for all students with disabilities who desire to enroll in PSE. In addition, social skills training should reflect the demands of social environments in PSE institutions. Planning for PSE has traditionally focused on skills (e.g., academic skills) that promote gaining admission into college. Such a focus neglects important skills (such as social skills) that affect persistence behavior in PSE. Also, PSE professionals who work with students with disabilities need to thoughtfully explore PSE resources that promote social integration.

The disparity in PSE outcomes based on gender underscores the need for attention to the PSE supports that are offered to male students with disabilities. Individuals who support students with disabilities in PSE need to examine and respond to the unique needs that male students may have in college. Also, previous research shows that males are significantly more likely than females to enroll in technical schools. To help ensure that male students with disabilities explore the full range of PSE possibilities for themselves, teachers, transition coordinators, and counselors should consider all PSE options and encourage males to research two- and four-year college programs. Additionally, male students should be encouraged to visit college campuses and meet with the admissions office to ask questions and gather information, and find out
whether the colleges that interest them have supportive resources that promote social integration. Furthermore, transition personnel need to conduct ecological assessments to check out the accessibility of facilities, and if possible to talk with other male students with disabilities who attend the school of interest and explore ways in which the new students can establish contacts with college students.

**Recommendations for Policy**

Success in post-secondary education has been a focus of federal and state policy for students with disabilities in the recent past. In response, transition planning and PSE outcomes have received much attention in special education research, with results influencing changes in classroom instruction, school policies, and legislation. Since this exploratory study was based on secondary data, definitive changes in policy may not be recommended. However, as suggested for practice, future federal, state, and local policies on PSE may need to emphasize early work study experiences, extra-curricular activities, self-advocacy, high academic achievement, and participation in general education.

IDEA requires that local education agencies must invite youth with disabilities to attend an IEP meeting if a purpose of the meeting will be the consideration of the post-secondary goals for the child and the transition services needed to assist the child in reaching those goals. The federal legislation intends for students’ goals and preferences to drive the transition process to ensure transition goals reflect students’ and families’ future aspirations. The findings reported here indicate that the federal intention is not being realized for many students served under IDEA. For example, less that 12% of students involved in IEP meetings were reported to take leadership roles. Federal policy on transition planning should focus on meaningful involvement of students and families in the IEP/transition planning processes.
In response to the need for early employment experiences, state and local policy leaders should encourage appropriation of funds for the development, and implementation of transition programs, including coordination of services with community partners involved in supporting internships, work experiences, and service learning for students with disabilities. Such opportunities may engage youth and help them make connections between their studies and future PSE and career goals. Policy leaders may also support community partners who employ or provide internship opportunities for students in transition programs by advocating for incentives, such as tax breaks.

Since these findings are still preliminary, and highlight the need for future research to examine the implications in more detail, policy efforts should be focused on increased support including funding for the field to conduct this research. Major developments in special education, and related to transition planning and self-determination in particular, occurred when the U.S. Department of Education dedicated funding to support research and development in those areas. Such efforts to critically examine the impact of PSE for youth with disabilities, as well as the factors that improve PSE completion should be a priority for the future.

Impact of Study

This study is relevant in two ways. First, it provides a more comprehensive picture of factors that influence PSE completion for students with disabilities who enroll in a variety of PSE institutions. To date no study has examined variables that contribute to PSE completion for students who received IDEA services and proceeded to enroll in vocational programs, two- and four-year colleges. The conceptual model used in the selection of variables in this study provides K-12 transition personnel as well as those in PSE institutions with information that can help them enhance the completion rate among students with disabilities. The impact of many of the
variables examined in this study (e.g., participation employment, and transition goals) on PSE completion has not been previously examined in detail. Thus, the findings in this study contribute to the evidence about transition services and PSE experiences that impact PSE completion.

As shown throughout the findings, this research supports previous findings that active participation in the IEP process, transition goals, and engagement in employment promote post-secondary success outcomes. In particular, this study builds upon the previous findings of Lombardy et al. (2012). In addition, this study lays a foundation for the examination of potential mediators in PSE research involving students with disabilities, and offers insight into factors that affect student engagement in social activities in college. This is especially relevant in the development of conceptual frameworks for understanding PSE success for learners with disabilities given that, the majority of the conceptual models currently in use were developed with students in the general population.
References


and hearing students within a post-secondary educational setting. *Disability & Society, 6*(3), 181-201.


http://www.adaptech.org/cfichten/abPredictingCollegeRetentionAndDropoutE.pdf.


http://www.ncset.org/publications/viewdesc.asp?id=1411


who stays: An assessment of the effect of a freshman mentoring and unit registration
program on college persistence. *Journal of College Student Retention: Research, Theory
& Practice, 4*(2), 95-122.


traditional curriculum or subversion of academic goals?" *Journal of Educational
Psychology, 84*, 553-62.


Martin, J. E., Van Dycke, J. L., Christensen, W. R., Greene, B. A., Gardner, J. W., & Lovett, D.

Linking transition assessment and postsecondary goals: Key elements in the secondary

of Education, 68*, 62-81

academic performance in first year Australian University students. *Higher Education
Research & Development, 20*(1), 21-23.


Sowers, J., & Powers, L. (1995). Enhancing the participation and independence of
students with severe physical and multiple disabilities in performing community activities. *Mental Retardation, 33*, 209-220.


## Appendix A

### NLTS-2 Variables

<table>
<thead>
<tr>
<th>Designation</th>
<th>Description</th>
<th>Level</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>(w1_EthHdr2001)</td>
<td>Race/ethnicity</td>
<td>1=white, 2=African American, 3=Hispanic, 4= other</td>
<td>Parent Survey- wave 1</td>
</tr>
<tr>
<td>(w1_GendHdr2001)</td>
<td>Gender</td>
<td>Male 1, Female, 2</td>
<td>Parent Survey- wave 1</td>
</tr>
<tr>
<td>(w1_IncomeHdr2001)</td>
<td>Income</td>
<td>1= $25,000 or less, 2= $25,001-$50,000, 3= More than $50,000</td>
<td>Parent Survey- wave 1</td>
</tr>
<tr>
<td>(w1_DisHdr2001)</td>
<td>Disability category</td>
<td>1=LD, 2=MR, 3=ED, 4=Autism, 5= other</td>
<td>Parent Survey- wave 1</td>
</tr>
<tr>
<td>(np1YAge)</td>
<td>Youth’s age at time of Wave 1 interview</td>
<td>1= 21-22, 2=23, 3=24, 4=25</td>
<td>Parent Survey- wave 1</td>
</tr>
<tr>
<td>(np1A4a)</td>
<td>Language other than English spoken in home</td>
<td>Yes=1, No =0</td>
<td>Parent Survey- wave 1</td>
</tr>
<tr>
<td><strong>Skills</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Advocacy: Role of youth in IEP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Prior Schooling</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(npr2A3a_1)</td>
<td>Instr settings for language arts (if received): General education classroom</td>
<td>Yes=1, No =0</td>
<td>Program survey-wave 2</td>
</tr>
<tr>
<td>(npr2A3b_1)</td>
<td>Instr settings for mathematics (if received): General education classroom</td>
<td>Yes=1, No =0</td>
<td>Program survey-wave 2</td>
</tr>
<tr>
<td>(np2AnyActivity)</td>
<td>Participated in any extracurricular</td>
<td>Yes=1, No =0</td>
<td>Parent survey-wave 1</td>
</tr>
</tbody>
</table>
COLLEGE SUCCESS

134

**ntgGPA_GPl**  
GPA earned in all courses in general education setting in this grade

Continuous  
Transcript

---

**Goals**

(npr2D4_11)  
Primary goals for student: Prepare for postsecondary education  
Yes=1, No =0  
Program survey-Wave 2

(npr2D4_10)  
Primary goals for student: Develop vocational skills  
Yes=1, No =0  
Program survey-Wave 2

---

**Institutional Experiences**

(np4P10_J6)  
How often youth got together with friends outside of organized activities in the past 12 months  
(0) Never got together (1) Got together sometimes not every week (2) Got together 1 day a week (3) Got together 2 or 3 days a week (4) Got together 4 or 5 days a week (5) Got together 6 or 7 days a week  
Parent/Youth survey-Wave 4

---

(np4P12_J8)  
How often friends called youth on the phone in the past 12 months  
(1) Never called (2) Rarely called-called less than once a month (3) Called a few times a month (4) Called about once a week (5) Called several days a week (6) Called every day  
Parent/Youth survey-Wave 4

---

(np4P13b_J10)  
How often youth takes part in e-mail,  
(1) Several times a day (2) Once a day (3) Several times a week (4)  
Parent/Youth survey-Wave 4
instant messaging, or chat rooms  

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Once a week (5)</td>
<td>Less often than once a week (6)</td>
</tr>
<tr>
<td>Never/does not know how to</td>
<td></td>
</tr>
</tbody>
</table>

(nP4P14b) How often youth did hobbies in the past week  

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 or more times (1)</td>
<td></td>
</tr>
<tr>
<td>3 or 4 times (2)</td>
<td></td>
</tr>
<tr>
<td>1 or 2 times (3)</td>
<td></td>
</tr>
<tr>
<td>Not at all (4)</td>
<td></td>
</tr>
</tbody>
</table>

(Parent/Youth survey- Wave 4)

(nP4P14c) How often youth just hang out with friends in the past week  

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 or more times (1)</td>
<td></td>
</tr>
<tr>
<td>3 or 4 times (2)</td>
<td></td>
</tr>
<tr>
<td>1 or 2 times (3)</td>
<td></td>
</tr>
<tr>
<td>Not at all (4)</td>
<td></td>
</tr>
</tbody>
</table>

(Parent/Youth survey- Wave 4)

(nP4P11) Youth was invited to social activities with friends in the past 12 months  

<table>
<thead>
<tr>
<th>Response</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes=1, No =0</td>
<td></td>
</tr>
</tbody>
</table>

(Parent/Youth survey- Wave 4)

**External Commitment**

(nP1AnyPaid) Any paid job or work study in past year  

<table>
<thead>
<tr>
<th>Response</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes=1, No =0</td>
<td></td>
</tr>
</tbody>
</table>

(Parent Survey-Wave 1)