ABSTRACT

Title of Document:	ACHIEVEMENT AND INTEGRATION FACTORS RELATED TO THE ACADEMIC SUCCESS AND INTENT TO PERSIST OF COLLEGE FRESHMEN AND SOPHOMORES WITH LEARNING DISABILITIES.
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The number of students with learning disabilities (LD) attending college has increased over the past several decades, yet outcomes including graduation rates continue to lag behind those of non-disabled students. In addition to students' background characteristics and past academic achievement, Tinto's (1975; 1993) constructs of academic and social integration have been the focus of much of the research identifying factors associated with college student success and persistence. Previous research has validated the impact of academic and social integration on college student persistence and success; however, these factors have not been studied with a sample of students who have disabilities.

In this investigation hierarchical multiple regression analysis was used to study the relative influence of pre-college achievement and college integration variables on the academic success and intent to persist of college freshmen and sophomores with LD, while controlling for background characteristics. Participants were 97 freshmen and sophomores with LD at a large, public university in the southwestern United States.

Students completed a demographic questionnaire as well as portions of the Freshmen Year Survey (Milem & Berger, 1997) to measure integration and intent to persist. High school GPA, *SAT* scores, and college GPA were obtained from university records.

Academic, social and total integration were not unique significant predictors of college GPA beyond background characteristics and past academic achievement. However, total integration was a significant predictor of intent to persist, accounting for 17 percent unique variance. Academic integration was a significant predictor of intent to persist accounting for 12 percent unique variance. Further, social integration was a significant predictor of intent to persist, accounting for 18 percent unique variance beyond background characteristics and past academic achievement and 7 percent unique variance in the model that also included academic integration.

These findings suggest academic and social integration are promising constructs to explain the persistence of college students with LD. Implications of this study include the need for continued research on the role of academic and social integration for college students with LD, as well as on the practices of high school and college personnel in preparing students with LD for college.

ACHIEVEMENT AND INTEGRATION FACTORS RELATED TO THE
ACADEMIC SUCCESS AND INTENT TO PERSIST OF COLLEGE FRESHMEN
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By

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Dedication

This work is dedicated to my brother Andrew, for all of your struggles and triumphs. And to my children Addison and Liam, I love you.

Acknowledgements

As I complete this journey, I would like to thank God for the blessings in my life, the opportunities that I have had, and the people that have supported me in life and throughout my educational endeavors. Thank you mom and dad for teaching me to believe in something and to care about what I do and how I do it. Thank you for your sacrifices and the countless ways you have supported me and my family. Thank you, grandma, for always showing interest in my thoughts and work, and for listening to me, talking to me, and arguing with me.

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Most importantly, I would like to thank my husband, Adam. Thank you for your encouragement, patience, and pride in the things I do. It means everything to me.

Table of Contents

List of Tables

List of Figures

Chapter I

Introduction

College is valued in American society as a means to increase opportunities for employment, earnings, and social capital (Tinto, 1993). Thus, it is encouraging that increasing numbers of individuals with disabilities, including those with learning disabilities (LD), are attending colleges and universities after graduation from high school (Heiman & Precel, 2003; Houck, Asselin, Troutman, & Arrington, 1992; Mull, Sitlington, & Alper, 2001; Sharpe & Johnson, 2001). Based on data gathered from the 1996 National Postsecondary Student Aid Study (NPSAS: 96), the U.S. Department of Education reported that approximately 6 percent of all undergraduates reported having a disability, and that 29 percent of those were students with an LD (U.S. Department of Education, 2000). According to the American Council on Education's 2001 report on college freshmen with disabilities, 2.4% of the college freshmen population at four year institutions self-disclosed as having an LD. This accounts for 27,000 of the 1.1 million college freshmen at four year institutions in 2000 and is up from 1% in 1988 (Henderson, 2001). The number of actual college students with LD is even greater when one considers those individuals attending college who have chosen not to disclose their disability through official channels (Rath & Royer, 2002).

Several laws have contributed to the increase of individuals with LD accessing higher education. The Individuals with Disabilities Education Act (IDEA) of 1990 and amended in 2004, the Americans with Disabilities Act (ADA), and Section 504 of the Rehabilitation Act of 1973 each contain provisions that have stimulated the increase in attendance of students with LD to institutions of higher education. For example, IDEA

requires transition planning and the participation of the student in such planning. Section 504 of the Rehabilitation Act and the ADA require that institutions receiving federal funding provide reasonable accommodations to college students who meet eligibility for having a disability. However, postsecondary outcomes of individuals with LD, including attendance at and graduation from institutions of higher education, continue to lag behind those of their non disabled peers, particularly at four-year institutions (Bursack, et al., 1989; Hippolitus, 1987; Murray, Goldstein, Nourse, & Edgar, 2000; Rojewski, 1999; Vogel, et al., 1998; 1999; Wagner & Blackorby, 1996). To ensure students with LD have equal opportunity to access, participate in, and succeed at college, research must be undertaken to understand the experiences of college students with LD and the factors that contribute to their academic success. The purpose of this study was to develop and study a more comprehensive model, controlling for background characteristics (i.e., race, gender, SES) and including past academic achievement and integration factors to predict the academic success and intent to persist of freshmen and sophomore college students with LD at a four year public institution. The rationale for this study was drawn from literature in which the focus was the academic success of college students with LD, the academic success of college students regardless of disability status, and factors affecting the retention of college students without regard to disability status. Following is a synopsis of these three bodies of literature.

College Students with LD

Characteristics of college students with LD. Learning disabilities is an umbrella term used to describe a group of disorders that affect the ability to acquire and use listening, speaking, reading, writing, reasoning, or math skills (Gerber & Reiff, 1994;

National Adult Literacy and Learning Disabilities Center (NALLD), 1995; National Joint Committee on Learning Disabilities (NJCLD), 1998). LD is intrinsic to the individual, occurs across the lifespan, varies in severity, and may manifest itself in one or more areas of a person's life. For adults, LD may affect a person's learning, working, social and emotional functioning, and executive functioning, including attention, concentration, and organization (Hoy, et al., 1997; NJCLD).

For college students, specifically, the presence of an LD may manifest in difficulty with written or spoken language resulting in a lower level of academic performance than would be expected (Gerber, 1998; NALLD, 1995; NJCLD, 1998; Skinner & Lindstrom, 2003). As well, problems with executive functioning can impact a college student's ability to organize, meet deadlines, and attend to the details of college assignments (Skinner & Lindstrom). Research has revealed that college students with LD often have difficulty managing time, focusing on academic tasks, telling others about their disability, and communicating needs to others (Smith, English, & Vasek, 2002). Beyond the classroom, an LD may affect the way in which a college student interacts with his or her peers, as well as faculty members. For example, individuals with LD often exhibit lower self-esteem, higher anxiety, and demonstrate poor interpersonal skills, resulting in difficulty with self-advocacy and social interactions, necessary skills for success in college (Hoy, et al., 1997; Reiff, 1995; Speckman, Goldberg, & Herman, 1992). The many ways in which an LD may manifest in the life of a college student is further complicated by the differences a student faces between the high school and college environment.

Differences between high school and college. As an individual with LD in high school, students are entitled to specific services under IDEA. Under IDEA, a student with an LD has an individualized education plan (IEP) which outlines the goals, objectives, and services specifically related to that student's education. There are requirements under the law regarding identification, timelines, the implementation of services, modifications, and accommodations, and the participation of the student, teachers, and parents. Further, student-teacher contact is greater in high school and the student's parent often serves as a primary advocate for the student (Dalke & Schmitt, 1987; Smith, et al., 2002). In sum, students with LD in high school may not understand their LD, possess self-advocacy skills, nor know their rights and responsibilities; yet they may still receive appropriate academic services and accommodations for their LD because of the system of support that exists under law in the K-12 setting (Brandt & Berry, 1991; Brinckerhoff, 1993; Harris & Robertson, 2001; Skinner & Lindstrom, 2003; Smith, et al., 2002). However, that system ends abruptly upon completion of high school and entrance into the postsecondary setting.

In college, individuals with disabilities are protected under the ADA and Section 504 of the Rehabilitation Act. Unlike in high school, where students with LD are entitled to specific services and accommodations, in college these individuals are eligible for reasonable accommodations. That is, the system changes for students from one of entitlement to one of eligibility. Rather than depending on the school system and its representatives to ensure appropriate services and accommodations, an individual with a disability in the postsecondary setting must self-identify as a person with a disability and seek out appropriate accommodations. Such a shift in focus requires college students with

LD to be self-aware and possess self-advocacy skills in order to access the services and accommodations available to them (Brinckerhoff, 1993; Field, Sarver, & Shaw, 2003; Skinner & Lindstrom, 2003). In the post-secondary setting students can no longer rely on parents or school personnel to ensure their needs are met. Further, academic competition and social demands increase in college and can present unique challenges to students with LD (Dalke & Schmitt, 1987; Smith, et al., 2002). A body of literature does exist in which the focus is on issues facing college students with LD, their experiences, and factors related to the success of individuals with LD in the postsecondary setting. Following is a synopsis of that literature.

Research on college students with LD. Although the breadth of the literature addressing college students with LD is growing, the depth in many areas is limited. Among the areas researched, studies have been conducted to examine: (a) foreign language requirements and course substitutions for college students with LD (Shaw, 1999; Sparks & Javorsky, 1999; Sparks, Phillips, Ganschow, & Javorsky, 1999); (b) perceptions of academic accommodations on the part of students (Hill, 1996; Houck, et al., 1992; Sweener, Kundert, May, & Quinn, 2002) and faculty (Houck, et al., 1992; Leyser, Vogel, Wyland, & Bruille, 1998; Nelson, Dodd, & Smith, 1990); (c) services provided by institutions for students with LD (Ganschow, Coyne, Parks, & Antonoff, 1999; Sharpe & Johnson, 2001; Vogel, et al., 1998; Yost, Shaw, Cullen, & Bigaj, 1994); and (d) experiences of and challenges faced by individuals with LD in the college setting (Hoy, et al., 1997; Nielsen, 2001; Reis, Mcguire, & Neu, 2000). Studies in each of these areas add to the body of research on college students with LD and to the understanding of the needs of students with LD. An additional focus of research has been on factors related

to the academic success of college students with LD. These studies have been both qualitative and quantitative in nature and are discussed below.

Qualitative studies have generally been undertaken to discover the perspective of the successful college student with LD. These studies have documented the skills and abilities possessed by college students with LD who are academically successful. Themes that emerge in these studies include the use of compensation strategies, self-advocacy, personal perseverance, and support from family, college personnel, and campus organizations, as key factors of academic success for this population (Miller, 2002; Reis, McGuire, & Neu, 2000; Reis, Neu, & McGuire, 1997). In general, successful students with LD report both individual characteristics (e.g. use of strategies, self-advocacy, and personal perseverance), as well as environmental experiences (e.g. support from campus organizations and family), as contributing to their success in college.

Researchers conducting quantitative studies in this area have attempted to isolate factors that contribute to the academic success of college students with LD. Five studies have been undertaken to compare students with LD to those without LD. Differences between the groups have been found in level of academic preparation as measured by high school performance and college entrance exam scores (Vogel & Adelman, 1990; 1992), as well as in the level of personal and academic support needed in college (Cosden & McNamara, 1997; Ryan, 1994; Ryan, Nolan, Keim, & Madsen, 1999).

Other researchers have conducted studies to identify factors impacting the success of college students with LD. The majority of research in this area has focused on individual characteristics of the student. Studies have shown that while background characteristics such as IQ scores, high school preparation and college entrance exam

scores have some predictive ability for this population, they are not sufficient for explaining college GPA (Murray & Wren, 2003; Vogel, 1993). Although some authors have attempted to include factors such as study skills and attitudes (Ashton-Coombs, 1993; Murray & Wren, 2003) and use of accommodations (Keim, McWhirther, & Bernstein, 1996) the results have indicated that such individual characteristics and behaviors of the students alone are not sufficient in predicting college grades for students with LD.

One weakness of research on factors contributing to the success of college students with LD is the focus on isolated characteristics of the individual. As noted by Gregg, Hoy, King, Moreland, and Jagota (1992), "unfortunately, the affective, cognitive, and academic abilities of individuals with learning disabilities are quite often treated as separate domains having very little impact on each other." (p. 386). This reality is reflected repeatedly in research investigating the success of college students with LD. More often than not researchers attempting to explain what matters for the success of college students with LD choose to include in their studies only academic and cognitive factors (i.e., SAT scores, high school GPA, and IQ scores) affective factors (i.e., self-concept and self-worth) or behavioral factors (i.e., use of accommodations or study habits). However, a model that includes all of the factors has yet to be considered. A further weakness with the research regarding students with LD in college is that researchers have failed altogether to consider contextual or interactional factors. Whereas retention research on college students in general has included environmental factors and experiences, the LD literature, as previously discussed, has primarily focused on student characteristics only. In order to better understand the major factors impacting the success

of college students with LD, the college student success and retention literature requires consideration.

College Student Success

Much like the LD literature, one major focus of researchers studying college students' success has been on GPA as the outcome variable. Researchers in this area have drawn their samples from college students without regard to disability status. Thus, the findings may be generalized to college students in general, and not specifically to students with LD. Because past academic performance, as measured by high school GPA or percentile rank and *SAT* or *ACT* scores, has consistently been shown to be correlated with college GPA, researchers typically include these as independent variables in their models (Wolfe & Johnson, 1995). In addition, researchers have often included affective and behavioral measures as independent variables. For example, researchers have identified personality variables, such as self control and organization, as significant predictors of college GPA above and beyond measures of academic ability (Tross, Harper, Osher, & Kneidinger, 2000; Wolfe & Johnson). Furthermore, researchers have combined affective characteristics, such as self-perceptions of creativity and social acceptance (Beck & Davidson, 2001; Boulter, 2002; House, 2002), and behavioral characteristics, such as time spent studying and participation in group projects (House) with cognitive and academic measures in order to develop more comprehensive models to explain college GPA. Consistently, however, these models have accounted for no more than one-third of the total variance in college GPA (Beck & Davidson; House; Tross, et al.; Wolfe & Johnson). Therefore, although this literature is useful in that multiple domains are considered simultaneously, results suggest that a piece of the puzzle is

missing. One possible avenue for expanding our understanding of academic success for college students may be found in the retention literature, in which researchers reach beyond past academic achievement and characteristics of the individual as explanations for academic success and persistence and include constructs such as student integration.

Retention of College Students

Tinto's Interactionalist Theory. Research on college student retention is most directly influenced by Vincent Tinto's Interactionalist Theory (Tinto, 1975). The cornerstone of this theory rests on the hypothesis that students' experiences at college, primarily the extent to which they become socially and academically integrated, have a direct impact on their institutional and goal commitment and thus retention (Tinto, 1975; 1993). Accordingly, students' experiences with the systems of the university, as well as their interactions and experiences with peers and faculty, determine the extent to which a student fits within the institution and the degree to which he or she will be socially and academically integrated into this new environment. These factors are considered determinants of the likelihood of students choosing to remain at the institution. Tinto's theory has been criticized over the years for his reliance on sociological theories of rites of passage and suicide as the basis of his model (Bean & Eaton, 2004; Rendon, Jalamo, & Nora 2004; Tierny, 1992), as well as his failure to initially include external influences on retention (Cabrera, Nora, & Castaneda, 1993; Shields, 1994). Nevertheless, Tinto's Interactionalist Theory, particularly his concepts of academic and social integration, remains influential in the field of college student retention; his is the most tested model in the field (Braxton, Hirschy, & McClenon, 2004; Braxton, Sullivan, & Johnson, 1997; Rendon, Jalomo, & Nora, 2004; Strauss & Volkwein, 2004). However, this model and

the constructs of academic and social integration have never been tested with college

students with LD. Thus, the constructs of academic and social integration from Tinto's

Interactionalist Theory were chosen as a basis of this study. Following is a summary of

the research on academic and social integration. A more comprehensive analysis of

Tinto's theory and research on academic and social integration will follow in chapter two.

Research on academic and social integration. Because of the influence of Tinto's

theory, modern research in which retention is the outcome variable has often included

academic and social integration, or related concepts, as predictor variables. Like research

on college student success, this research has been conducted with samples drawn from

colleges and universities, without regard to students' disability status. Thus, the findings

may be generalized to college students in general, and not specifically to students with

LD. The results of studies focusing on these variables have been mixed. For example,

some researchers (Braxton & Brier, 1989; Strauss & Volkwein, 2004) have found that

level of academic integration has a direct impact on decision to persist and can be used to

discriminate between freshmen persisters and non persisters (Pascarella & Terenzini,

1980). Others research has yielded findings indicating that academic integration does not

directly affect intent to reenroll for freshmen college students (Milem & Berger, 1997).

In addition to the findings regarding academic integration, researchers have

documented that level of social integration, above and beyond high school percentile

rank, *SAT* scores, and other background characteristics, such as parent level of education,

influences intent to re-enroll and persistence (Braxton, Milem, & Sullivan, 2000; Milem

& Berger, 1997; Pascarella & Terenzini, 1980; 1983; Strauss & Volkwein, 2004).

However, the organizational attributes of the institution (i.e., selectivity, size, and type-2

year versus 4 year) and student characteristics (i.e. past academic achievement, SES,

gender) appear to influence the impact social and academic integration have on student

retention (Braxton & Brier, 1989; Braxton & Lien; Milem & Berger; Strauss &

Volkwein). Thus, institutional setting and the study sample must be clearly defined and

findings cautiously generalized from studies in which the focus is factors affecting

academic success and persistence of students.

Purpose of Study

The purpose of this investigation was to study the influence pre-college

achievement and college integration variables have on the academic success and intent to

persist of college freshmen and sophomores with LD, while controlling for background

characteristics, by (a) measuring the relative contribution of past academic achievement,

academic integration and social integration on college GPA, and (b) measuring the

relative contribution of past academic achievement, academic integration, and social

integration on intent to persist. For the purpose of this study, academic success was

defined as first year cumulative GPA. Figure 1 illustrates the hypothesized model of

academic success and intent to reenroll for college students with LD. Predictor variables

for this model were chosen based on the research previously conducted in the fields of

LD and college student success and retention and will be further explained and justified

in Chapter 2 and 3. The predictor variables for this model fall into three categories, those

which reflect personal background characteristics, variables that represent past academic

achievement and finally those which are based on the interaction the individual has with

the college environment. Background characteristics and past academic achievement

variables were drawn from the research on college students with LD, as well as college

student success and retention literature. Past academic achievement was measured by high school GPA and *SAT* scores. These measures of past academic achievement were chosen because research has consistently shown that high school GPA and *SAT* scores are related to college GPA and retention (Beck & Davidson, 2001; Milem & Berger, 1997; Pascarella & Terenzini, 1980; Titus, 2004; Tross, et al., 2000; Wolfe & Johnson, 1995). Interaction, or integration, variables were drawn from the college student retention literature and include measures of academic integration and social integration. Academic and social integration were measured by subscales of the Freshmen Year Survey (Milem & Berger, 1997*)* which will be discussed further in Chapter 3. It was hypothesized that level of academic and social integration would be strong predictors of GPA and intent to reenroll for college students with LD, above and beyond that of background characteristics and past academic achievement.

Model of Academic Success for College Students with LD

Background Characteristics	Past Academic Achievement	Integration
*Race/Ethnicity	*High school GPA	*Academic integration
*Gender	-Overall	*Social integration
*SES (mother's level of	*SAT scores	*Total integration
education)	-Composite	

College GPA

Intent to Persist
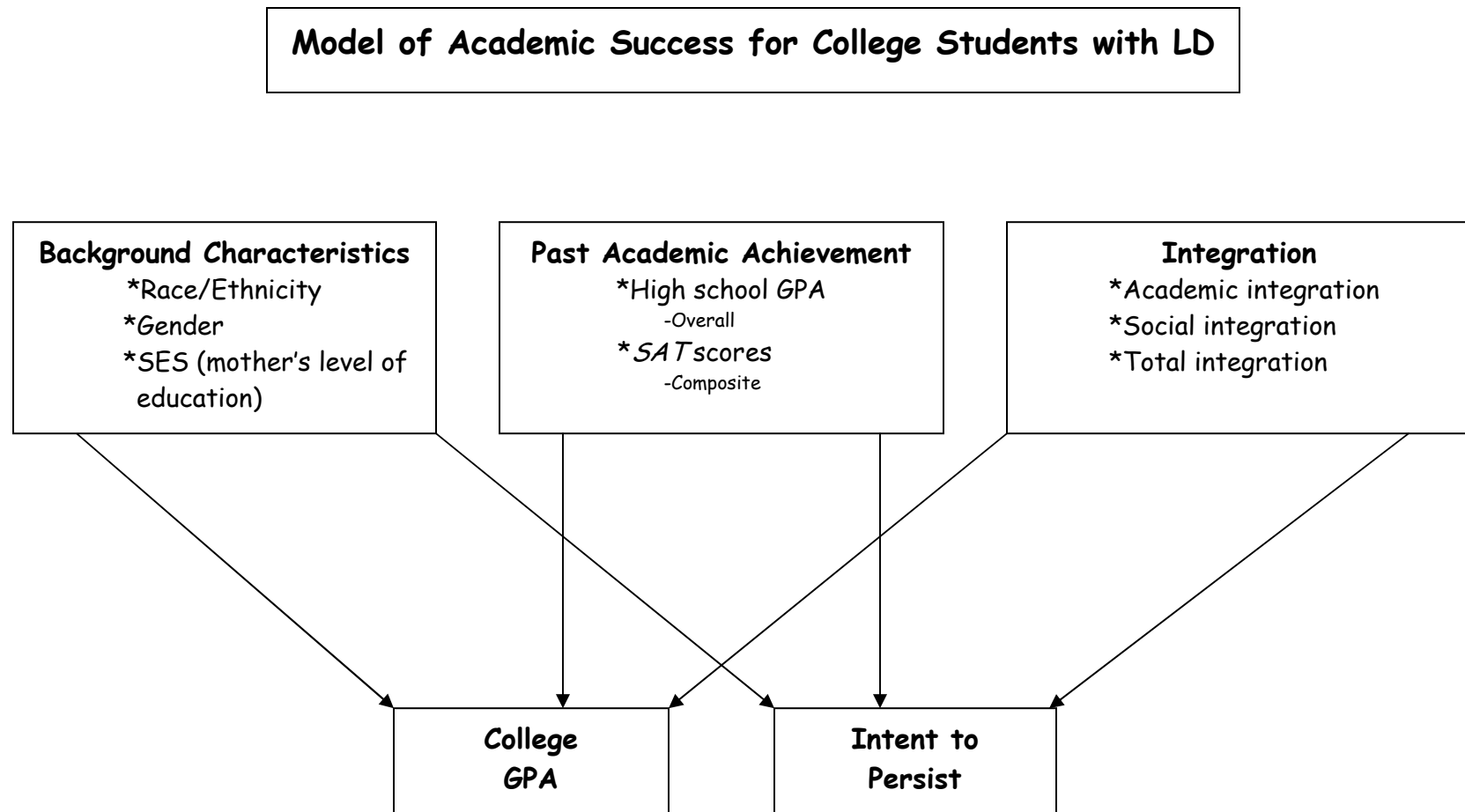
Figure 1. Hypothesized model of academic success for college students with LD.

Research Questions

In order to test the hypothesized model of factors related to the academic success and intent to reenroll of college freshmen and sophomores with LD, two research questions were addressed in this study:

1. Controlling for background characteristics, what are the relative contributions of past academic achievement, total integration, academic integration, and social integration to college GPA for college freshmen and sophomores with LD?

2. Controlling for background characteristics, what are the relative contributions of past academic achievement, total integration, academic integration, and social integration to intent to persist for college freshmen and sophomores with LD?

Definition of Terms

Learning disabilities. There are several definitions for LD. For the purpose of this study the consensus definition provided by the National Joint Committee on Learning Disabilities (NJCLD, 1998) was used as the conceptual definition. The definition is as follows:

Learning disabilities is a general term that refers to a heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning, or mathematical skills. These disorders are intrinsic to the individual, presumed to be due to central nervous system dysfunction, and may occur across the life span. Problems in self-regulatory behaviors, social perception, and social interaction may exist with

learning disabilities but do not, by themselves, constitute a learning disability.

Although learning disabilities may occur concomitantly with other disabilities

(e.g., sensory impairment, mental retardation, serious emotional disturbance), or

with extrinsic influences (such as cultural differences, insufficient or

inappropriate instruction), they are not the result of those conditions or influences.

(NJCLD, 1998, p. 1).

For the purpose of this study, LD was operationalized by adherence to the criteria set

forth by the participating university's Disability Resource Center (DRC). All students

with an LD who wish to be eligible to receive reasonable accommodations must be

registered with DRC. Students must provide a current (within three years) psycho-

educational evaluation conducted by a professional diagnostician. The evaluation must

include comprehensive measures of aptitude, achievement, and cognitive/information

processing. Scores from approved measures must be included in the documentation. It

must be demonstrated that the learning disability limits one or more major life activity,

including learning, currently and substantially.

　　　Academic integration. The construct of academic integration was taken from

Tinto's Interactional Theory of student persistence (Tinto, 1975; 1993). Academic

integration is the interaction between the individual and the academic systems of the

institution. Academic integration includes both structural and normative integration.

Structural integration reflects meeting the standards of the university (e.g., maintaining a

certain GPA) whereas, normative integration reflects an individual's intellectual

development and identification with the norms of the academic systems (Tinto, 1975).

Academic integration captures a student's satisfaction with his or her academic

experience at the university and his or her perceived intellectual development and growth. Additionally, the extent to which a student views his or her interpersonal relationships with faculty and peers on campus as promoting intellectual growth and development and influencing attitudes, beliefs, and values contributes to a student's academic integration. Therefore, the perception of faculty interest in students and student ideas, as well as faculty contact inside and outside of class are measures of academic integration. In order to become academically integrated, a student presumably has meaningful contact with both faculty and peers in which his or her academic interests are addressed. Such interaction may include contact during office hours, working with a faculty member on a research project, interaction with faculty in social or non-classroom settings, study groups or collaboration with class mates, and formal and informal conversations with both faculty and peers about interests and ideas relevant to the student.

For the purpose of this study academic integration was a reflection of an individual's perception of his or her academic performance, intellectual growth, connectedness to the university, and satisfaction with the academic environment. Although Tinto asserts that GPA is a reflection or component of academic integration, for purposes of this study GPA was not a measure of academic integration, but rather academic integration was studied as a predictor of GPA. Academic integration was defined operationally by scores on the *Academic Integration* subscale of the *Freshmen Year Survey (FYS)* (Milem & Berger, 1997).

Social integration. The construct of social integration was also drawn from Tinto's interactional theory of student persistence (Tinto, 1975; 1993). Social integration

is defined as the interaction between the individual and the social systems of the institution, including peer groups, faculty and administrators, and extra-curricular activities. Much the same as academic integration, social integration includes a student's perception of how interpersonal relationships with faculty and peers impact his or her values, attitudes, beliefs, and intellectual growth and development. Additionally, social integration occurs as a student develops intimate friendships and personal relationships with other students and faculty. The extent to which a student perceives others in the campus community as caring about them personally and having interest in them as an individual impacts social integration.

For the purpose of this study, social integration reflected the extent to which an individual was satisfied with social interactions and the individual's perception of his or her involvement and relationships with peers and faculty on campus. Social integration was operationally defined by scores on the *Social Integration* subscale of the *FYS* (Milem & Berger, 1997).

Past academic achievement. The construct of past academic achievement was drawn primarily from the literature on college student success and retention. Past academic achievement can be defined as the skills and abilities an individual possesses as represented by past performance. This is reflected in an individual's documented history of academic attainment throughout high school. Colleges and universities make decisions about student preparedness based on past academic achievement as reflected in high school GPA and SAT scores. Thus, the operational definition of past academic achievement was a combination of overall high school GPA and *SAT* composite scores.

SAT. The *SAT* is a standardized achievement test of language skills and mathematical abilities. The test is intended to assess learned skills (Cohn & Cronbach, 1987). Scores from the *SAT* are routinely used by colleges and universities as admissions selection criteria. The scores used in the analyses were the composite scores, including *Verbal* and *Math*. The *Verbal* subtest assesses an individual's language skills in four areas: antonyms, analogies, sentence completions, and reading comprehension. The *Math* subtest contains two types of items: general math skills and quantitative comparisons. For both subtests the scores are on a scale from 200 to 800. *Verbal* and *Math* mean scores for college bound seniors in 2005 were 508 and 520, respectively (College Board, 2005).

High school GPA. GPA (Grade Point Average) is a scale used by high schools to represent the achievement of students. GPAs are typically on a scale ranging from .0 to 4.0 and represent the average of all course grades. The most common system of numerical values for grades are A = 4, B = 3, C = 2, D = 1, and F = 0. In some cases, due to enrollment in advanced placement and honors courses in which an A= 5 points, a B= 4 points and so forth, students may earn a GPA greater than a 4.0. However, at the participating university, the admissions office recalibrates all high school GPAs to a 4.0 scale such that an A in any course equals a 4, a B=3, and so forth. For the purpose of this study overall high school GPA was used. This GPA, as defined by the admissions office, includes all high school courses taken by the student.

College GPA. Like high schools, colleges use the GPA scale to represent the achievement of students. At the participating university GPAs are on a scale ranging from 0 to 4.0. The numerical values for grades are A=4, B=3, C=2, D=1, and F=0. For the

purpose of this study cumulative GPA after the spring semester of the students' first year of enrollment was used.

   L.S.C. (Learning Strategies Center). All but one of the participants in this sample were enrolled in L.S.C. on campus. L.S.C. is a free standing, fee for services program designed to assist students with learning and attention challenges in the college setting. The involvement of L.S.C. in recruitment efforts and the specific services provided by this program will be described in depth in chapter 3. However, it is necessary to note the uniqueness of this sample, based on their participation in L.S.C. That is, students who pay the fee and enroll in L.S.C. are able to access services beyond the "reasonable accommodations" provided under the American with Disabilities ACT (1990) and Section 504 of the Rehabilitation ACT.

Chapter II

Literature Review

For the purpose of this study, literature was reviewed which pertained to college students with LD, the academic success of college students as measured by college GPA, and college student retention. In this study, the use of the term "college student" refers to a sample selected without regard to disability status. Based on the review of literature, research questions are presented which address the proposed model of academic success and retention for college students with LD.

Search Procedures

The search for research articles for this review included several steps. Multiple on-line data bases were searched. A search through EBSCO included Academic Search Premier, Education Abstracts, Education Resources Information Center (ERIC), MasterFILE Premier, PsycARTICLES, Psychology and Behavioral Sciences Collection, and PsychINFO databases. Digital Dissertation database was also searched. Initial descriptors for the online searches included "post-secondary", "college", "learning" disabilities", "learning disorders", "academic risk", and "learning problems". In order to narrow the search of literature related to the academic success of college students with learning disabilities, "success" and "retention" were alternately added as keywords. A subsequent search was conducted in order to locate literature related to the retention of college students in general, rather than just college students with LD. Descriptors used were: "college", "college students", "post-secondary", "retention", "persistence", "graduation", and "success".

Based on a review of the literature from the initial computerized searches, a search was conducted using the names of researchers whose work was particularly relevant to the topic. Names searched were: Pamela Adelman, John Braxton, John Bean, Joseph Berger, Christopher Murray, Ernest Pascarella, Patrick Terenzini, Vincent Tinto, and Susan Vogel. As well, an ancestral search through the references of the articles obtained was conducted. Finally, a search through the most recent (2000-2005) issues of the following journals was conducted: *College Student Journal, Exceptional Children, Journal of College Student Development, Journal of Educational Psychology, Journal of Higher Education, Journal of Learning Disabilities, Journal of Special Education, Learning Disabilities Research and Practice, Learning Disability Quarterly, and Research in Higher Education*.

The studies identified fell into one of two categories. The first includes studies in which the population was college students with LD. These studies typically examined adjustment, retention, and GPA as outcomes for students with LD. A number of studies in this first category employed designs to compare college students with LD to those without on a variety of variables. In general, whether these studies compared students with LD to those without or focused only on an LD population, the authors typically investigated characteristics of the individual (e.g., achievement, IQ, prior academic preparation, self-efficacy, study skills, etc.) as independent variables.

The second category includes studies in which the population was college students, with no attention paid to the disability status of the participants. These studies typically focused on adjustment, retention, and GPA, as well as graduation and persistence as outcomes. The focus in many of these studies was also on characteristics of

the individual student, however many also address contextual variables, especially those related to student interaction with the college environment.

Theoretical Framework

The theoretical framework for this study was based on an adaptation of Vincent Tinto's Student Integration Model (Tinto, 1975; 1993). Tinto's is a longitudinal model based on the fit between an individual and the college environment. Tinto asserts that his model is intended to explain departure from a particular college or university, rather than system departure. The theory rests on the premise that the greater an individual's academic and social integration, the more likely he or she is to persist. Tinto argues that students enter college with background characteristics (i.e., past academic performance, ethnicity, SES, and parental encouragement) which influence their initial commitment to the university they are attending (institutional commitment) and their initial commitment to graduate from college (goal commitment). An individual's background characteristics and initial institutional and goal commitment, according to Tinto, influence the quality of interactions an individual has with the academic and social systems of the university. In turn, the level of academic integration influences an individual's subsequent goal commitment and thus influences his or her decision to persist or withdrawal from college. Additionally, the level of social integration influences an individual's subsequent institutional commitment and thus his or her decision to persist or withdrawal from college.

Tinto's theory is one of college student persistence, not academic success. That is, his model is intended to explain persistence of students throughout college, rather than explain or predict academic achievement in the form of GPA. Further, Tinto is explicit in

his declaration that his is a model of "voluntary withdraw". He contends that this model

can be applied to the 75-85% of college leavers who withdraw voluntarily, rather than the

15-25% who are academically dismissed because of inability or unwillingness to meet the

minimum academic requirements of college (Tinto, 1993). Thus, the majority of research

which has attempted to validate all or parts of Tinto's model has had retention, rather

than academic success or GPA as the outcome. However, a few researchers have

recognized and studied the impact that constructs within Tinto's model may have on

GPA for college students (Bean & Kuh, 1984; Boulter, 2002; House, 2002). The findings

of these studies have indicated that constructs such as academic and social integration

may be useful for predicting GPA, in addition to explaining student persistence.

Empirical review of Tinto's model. In analyses evaluating the empirical support of

Tinto's model, reviewers (Braxton, Hirschy, & McCLendon, 2004; Braxton & Lien,

2004; Braxton, Sullivan, & Johnson, 1997) have reported moderate to strong support for

the propositions of academic and social integration. Braxton et al. (1997) assessed the

magnitude of empirical support for the fifteen propositions of Tinto's original model,

including the assertions that the greater the degree of academic integration and social

integration the greater level of subsequent commitment and likeliness to persist. In their

analysis the authors determined the percentage of tests of a given proposition that

affirmed the proposition. Braxton et al. deemed strong empirical support for a proposition

if 66 percent or more of the reviewed studies yielded statistically significant affirmation

of the proposition. Moderate support was judged if between 34 percent and 65 percent of

the tests yielded statistically significant support. Finally, the proposition was considered

to have weak empirical backing if 33 percent or less of the studies provided statistically

significant support of the proposition. Although Tinto's model is intended to explain departure from an individual college, Braxton et al. included both multi-institutional and single institutional studies in their assessment.

The proposition that social integration directly influences subsequent institutional commitment, and thus persistence yielded strong to moderate empirical support. In the aggregate, 66 percent of single institutional tests rendered social integration as a having a statistically significant positive effect on subsequent institutional commitment. Sixty percent of multi-institutional tests supported the influence of social integration on institutional commitment. The authors also assessed the empirical backing of this proposition by institution type. Two of the three studies conducted at four year institutions confirmed the proposition.

The proposition that academic integration directly influences students' subsequent goal commitment, and thus persistence yielded only moderate support in the aggregate. Fifty percent of multi-institutional tests resulted in statistically significant support for the proposition. Only 42 percent of single institutional tests supported the proposition. In terms of tests at four year institutions, two of the three studies empirically supported the impact of academic integration on subsequent institutional commitment and persistence. Braxton et al. also assessed the empirical backing for the proposition that academic and social integration are mutually interdependent and reciprocal in their influence on student persistence. The authors found that 75 percent of studies testing the compensatory interaction between social and academic integration support the proposition.

Given the relatively weaker results of the Braxton et al. (1997) analysis regarding the influence of academic integration on subsequent goal commitment and student

persistence, Braxton and Lein (2004) conducted an additional analysis to determine the extent of research support for the influence of academic integration on subsequent *institutional commitment*, and thus persistence. The authors used the same criteria as Braxton, et al. in their analysis, but the second analysis differed in that institutional commitment, rather than goal commitment, was the outcome variable. In their review of both multi-institutional and single institutional studies of the influence of academic integration on institutional commitment, Braxton and Lien concluded that 75% of multi-institutional tests and 64% of single institutional tests revealed a statistically significant relationship between academic integration and subsequent institutional commitment. The authors further reported that 75% of multi-institutional tests, whereas only 51% of single institutional tests provided robust empirical support for the influence of academic integration on actual student persistence. Thus, it may be that academic integration influences student persistence through institutional commitment, rather than goal commitment, as originally posited in Tinto's model. Additional literature investigating the feasibility of academic and social integration as predictors of college student persistence and success is reviewed later in this chapter.

Theoretical criticisms of Tinto's model. A major criticism of Tinto's model is his use of Van Gennep's anthropological theory of rites of passage and Durkheim's sociological theory of suicide to explain college withdrawl. The criticisms in these areas are often centered on the applicability of the theory to ethnic and racial minority students. A further criticism of Tinto's theory is in regards to the emphasis placed on the individual's responsibility for success, rather than the responsibility of the institution. A

discussion of these criticisms and the rationale for testing particular aspects of Tinto's model with a population of students with LD follows.

In his critique of Tinto's model of student departure, Tierny (1992) criticizes Tinto for incorrectly applying anthropological and sociological constructs to student departure, which in effect create a theoretical model not applicable to racial and ethnic minority students. Tinto uses Van Gennep's stages of separation, transition, and incorporation, drawn from his theory of rites of passage, to describe the way in which students become integrated in college. Tierny takes issue, in particular, with the stage of separation. He argues that where Tinto's model assumes students must separate from one culture (i.e., past family life and associations) to become part of another (i.e., college life), Van Gennep concept of rites of passage was intended to describe the process of moving through stages within one culture. Tierny argues that Tinto's conceptualization of student integration requires ethnic minority students, for example, to assimilate into a dominant culture on campus and leave their culture behind in order to be successful in college. Tierny points out that Van Gennep never intended his model to be applied to instances where an individual was leaving one culture for another. Further, Tierny argues that this assimilation perspective overvalues the dominant culture and devalues the ways in which a student may rely on his or her family and friends for support in college.

Rendon, Jalomo, and Nora (2004) point out that Tinto's conceptualization of rites of passage as a the means to integration relies not only on the assumption that in order to be successful at college students must separate from their past associations, but that one dominant culture exists in which students must assimilate in order to succeed. Further, Rendon et al., take issue with Tinto's assumption that it will be easy for all students to

find membership into the new culture of college. These authors draw on the work of others to challenge these assumptions and argue that the two cultures, a student's past and the culture of college, do not have to be mutually exclusive. In addition, Rendon et al. take issue with the emphasis placed on individual responsibility in Tinto's model. The authors discuss the need for institutions to take responsibility in reaching out to students of various backgrounds in order to promote their integration, rather than assuming the opportunity to become integrated exists for all students equally.

Though Tierny (1992) and Rendon et al. (2004) criticized Tinto's model primarily on the basis of its applicability for racial and ethnic minority students, the criticisms are also relevant for students with LD. It has been documented that students with LD continue to rely on their past culture and the supports present there (i.e. parental support) during their time in college (Greenbaum, et al., 1995; Reis, et al., 1997; Ryan, 1994). Moreover, others (Brandt & Berry, 1991; Brinckerhoff, 1993; 1996; Field, Sarver, & Shaw, 2003; Greebaum, et al.; Hoffman, 2003; Lock & Layton, 2001; Skinner & Lindstrom, 2003) have noted the importance for college students with LD to develop skills which will allow them to develop positive relationships with peers and faculty in college and access appropriate supports. Indeed, it may be that for students with LD staying connected to past resources, while becoming integrated into the college environment, is most desirable as they face a system dramatically changed from what they are used to. However, because Tinto's model and the concepts of academic and social integration have never been formally tested with students with LD, it is unclear to what extent it is relevant for this population of students.

Tinto's model and students with LD. In addition to the probability that the constructs of academic and social integration may be useful in predicting GPA for college students, experts in the field of LD have long promoted similar concepts as key to the success of college students with LD. For example, Siperstein (1988) noted that students with LD often cite difficulties in establishing appropriate relationships with faculty and problems with issues of social isolation in college as barriers to their success. Research (Cosden & McNamara, 1997; Ryan, et al., 2000) has also indicated that college students with LD report needing more support from friends and campus organizations than their non disabled peers. Experts have suggested that college students with LD would benefit from study skill development, as well as self-advocacy and social skill development in order to better establish positive relationships with faculty and peers and be better prepared for the demands of college (Brandt & Berry, 1991; Brinckerhoff, 1993; Field, et al., 2003; Hoffman, 2003; Skinner & Lindstrom, 2003, Yuen & Shaughnessy, 2001). Thus, the inclusion of academic and social integration in a model to predict GPA and intent to persist for college students with LD was warranted. Because Tinto's model has never before been tested on with a sample of college students with LD, this research project adds to body of literature aiming to provide empirical analyses of Tinto's model for diverse populations of college students.

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Review of Literature

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College Students with LD

The literature reviewed in relation to the academic success of college students with LD falls into three categories (a) qualitative studies reflecting student perspectives of factors contributing to success, (b) quantitative studies comparing college students

with LD to those without LD on various cognitive and affective variables, and (c) studies

in which the authors investigated the success of colleges students with LD in relation to

various cognitive, behavioral, and affective factors.

Qualitative studies. Qualitative methodologies are useful in educational research

to explore phenomena and answer questions regarding how or what is occurring

(Creswell, 1998). Unique in its focus on the perspective of the participants, qualitative

research in the area of college students with LD has provided some insight into what

contributes to the success of college students with LD. Three studies (Reis, Neu, &

McGuire, 1997; Reis, McGuire, & Neu, 2000; Miller, 2003) were identified in which the

authors used qualitative methods to describe the characteristics and experiences of

successful college students with LD.

Reis, Neu, and McGuire (1997) used a case study approach to investigate the

experiences of twelve successful college students with LD. Two of the participants were

graduates of the university, and the remaining ten had been at the university between one

and seven semesters; all had been or were currently enrolled in the University Program

for Students with Learning Disabilities. The specific university was not described in the

study, though it was referred to as "a major state university". Document review of

information such as LD documentation, IQ and achievement scores, performance in

academic areas, and academic portfolios were used to determine the labels of giftedness

and LD for each student. Two of the researchers interviewed each of the participants two

to three times for two to three hours over a six month period, while one researcher

interviewed one or both parents of each participant. Participants responded to an open-

ended questionnaire, and documents related to school records and testing were reviewed by the researchers. It appeared that parent interviews were not used in the analyses.

The authors identified two core categories that characterized these individuals' life experiences and influenced their experiences in college. The first category was *Negative School Experiences*. Negative school experiences included the late identification of LD, placement in a self-contained special education class, repetition of a grade during K-12 schooling, negative interaction with some teachers, difficulty with peer relationships, tracking and lack of effort in school, difficulty in reading and writing, and difficulty reconciling high abilities and learning disabilities. The second core category was *Integration of Personal Traits*. The emergence of this category, the authors report, reflects the ways in which the participants used their personal strengths, learning strategies, and adaptation to their environment to succeed. This category reflects the factors, as identified by the participants that led to their success in the academic setting.

Four categories within the core category of *Integration of Personal Traits* emerged in this study. First, the authors report that all twelve of the participants identified the use of compensation and learning strategies in order to succeed academically. The specific strategies identified by each participant varied, but included self advocacy, use of accommodations, metacognition, and organization techniques. A second factor that contributed to their academic success reported by all of the participants was parental support, not limited to but including advocacy, financial support, and assistance with school work. The third factor unanimously identified by the students as positively impacting their academic success was participation in the University Program for Students with Learning Disabilities. Finally, the authors reported that a majority of the

students cited their own hard work as an important factor contributing to their success. The authors concluded that despite early and sometimes persistent negative school experiences as a result of being identified as LD, positive intervening factors (e.g., parental support, compensation strategies, and support from campus programs) are related to academic success of gifted individuals with LD.

Although this study provides insight into the experiences of college students with LD, some limitations exist. First, the authors define the population as successful and gifted, but do not provide detailed descriptions of either of these constructs. Additionally, the students' class standing and ages are quite varied, ranging from one semester in college to graduated, and from 19 to 45 years old. It is likely that as students make their way through college, factors that impact their academic success are altered or expanded. For example, an older student may not rely as heavily on parental support as a young adult coming directly from high school. Thus, studying such a broadly defined population in terms of year in college and age may not get at some of the critical factors for freshmen versus seniors, or first time young adults versus non traditional students.

In another study, Reis, McGuire, and Neu (2000) investigated the compensation strategies used by twelve successful university students with LD. Purposive sampling was used to identify individuals who (a) were currently enrolled at the university or who had graduated within the last year, (b) had a documented learning disability and were currently, or had been during their time as a student, eligible for disability support services, (c) were gifted based on high IQ or achievement scores or a talent in a non academic area, and (d) were academically successful in the university setting. Participants provided written responses to open ended questionnaires and were

interviewed by one of the researchers. Additionally, the researchers conducted interviews with one of the parents of each participant and reviewed documents related to educational records. Results of parent interviews were not reported.

Results from this study indicated that each of the students used a variety of compensation strategies to succeed in college. In relation to the use of compensation strategies, three themes emerged. First, the authors report each student developed a unique profile of strategies used based on his or her strengths and weaknesses. Second, the participants described their efforts towards their study as time consuming. Finally, the researches found there exists a continuum of ease for these students regarding using compensation strategies, particularly academic accommodations. While some students reported comfort in using accommodations, others reported feeling guilty about needing and receiving support that others were not entitled to.

In terms of specific strategies used, all of the participants identified study, cognitive, and learning strategies, as well as the use of compensation supports such as computers and books on tape. Though not identified by all participants, additional themes emerged related to strategies employed for academic success. For example, students reported developing connections to other students, selecting professors they thought would be fair and willing to make accommodations, and limiting employment.

This study suffers from several methodological limitations. Of primary concern is the lack of operational definitions of various constructs. For example, the authors described the sample as academically successful, but did not define what that meant (e.g., GPA, graduation). Additionally, the researchers categorized the participants in the sample as gifted. However, only two of the participants were ever formally identified as gifted in

school, and a detailed description of the criteria for the label of gifted for the purpose of this study was not provided. Thus it is difficult to know to whom the results generalize.

In a study of resilience in college students with learning disabilities, Miller (2003) interviewed six resilient students with LD and four non resilient students with LD for two hours using an open ended interview protocol. All participants attended and received support services from a state university in the Midwest. Resiliency was defined as achieving a college GPA of at least a B+ in one's major. In his analyses of interview transcripts, Miller identified themes in which the two groups of students differed. For example, resilient students were more readily able to discuss successful experiences and positive encounters with teachers. Conversely, non resilient students had difficulty describing successful experiences and were more likely to describe negative experiences with teachers. Further, resilient students were able to describe their LD and compensation strategies, as well as identify and elaborate on personal areas of strength. Although the non resilient students reported being aware of their LD, they were not able to identify useful coping strategies, nor were they able to elaborate on areas of strength.

This study suffers from several methodological flaws, including poor definition of constructs. Miller notes the lack of consensus in the field for what resilient means, but chooses a GPA of B+ or better as a defining characteristic. His rationale for this choice is that having an LD would predict a poorer outcome; however he does not justify this statement and his choice of a B+ remains arbitrary. Furthermore, he does not provide sufficient detail regarding the GPAs of the non-resilient students, other than to say they are below a B+ average. Finally, based on his coding and analysis of data he determines several categories in which the two groups differ from one another. However, he does not

acknowledge that each of the categories appears to be rooted in language skills, specifically the ability to verbally describe in detail various concepts and experiences.

Methodological weaknesses of each of the qualitative studies reviewed (Miller, 2003; Reis, et al., 1997; Reis, et al., 2000) include poor definition of constructs and sample description. However, the studies do provide insight into the experiences of college students with LD. The focus of each study on "successful" students sheds light on the attributes and experiences of college students with LD who achieve academically in the postsecondary setting. Themes present in the findings of each of the studies reveal that college students with LD identify the use of compensation strategies, self-advocacy, support from family, college personnel, and campus organizations, and personal perseverance as key factors in their academic success.

Comparative studies. A body of literature exists in which researchers have compared college students with LD to their peers without disabilities on a variety of factors. Some researchers have aimed at determining how the populations differ on academic and cognitive factors, while others have focused on affective and behavior factors.

Academic and cognitive factors. As part of a descriptive eight year follow-up study on the educational and employment attainments of individuals with LD, Vogel and Adelman (1990) compared 110 college students with LD to a random stratified sample of 153 college students without LD on high school experience and performance, *ACT* scores, college GPA, and college graduation rates. The two groups attended a small, private college between 1980 and 1988 and were matched on gender, college experience, and semester in college. IQ scores were not available for the sample without LD,

however mean IQ scores for the LD sample were in the average range (FSIQ *M*=104, VIQ *M*= 103, PIQ *M*= 105; *SD* not reported). All of the participants with LD received support services from the university.

Findings reveal that the two groups differed on *ACT* scores and high school preparation as measured by number of regular English and math courses completed with a C or better and the number of D and F grades. The LD group earned significantly lower scores than the control sample on all four subtests and the composite *ACT* and demonstrated poorer high school performance. However, the subgroup of students with LD who graduate scored significantly poorer only on the Social Studies and English subtests of the *ACT*, when compared to the non-disabled graduate subgroup. Differences existed between the two groups in term of college performance, as well. The LD group had significantly lower mean GPA at the end of each year and at exit from college than did the non-disabled group. As well, the LD group had significantly more D and P grades did the non-disabled group. However, no significant differences in graduation and academic failure rate existed between the two groups. In terms of graduation status, the *ACT* accounted for 31 percent of the variance in graduation status for the LD group and 39 percent of the variance in graduation status for the non-disabled group. The authors did not indicate the percentage of variance explained by other factors such as high school performance or background characteristics.

In a secondary analyses, the authors compared the LD graduates (*n*=26), plus seven other students with LD who had graduated from another college, to the LD non graduates on high school performance, ACT scores, IQ and achievement scores, and motivation and attitude. There were no differences between the two groups on ACT

scores, IQ scores, severity of achievement deficits, or aptitude-achievement discrepancy. The authors found that the LD graduates had taken and passed with a C or better significantly more regular English classes and significantly fewer developmental math classes in high school. Further, the LD graduates demonstrated significantly better oral language abilities, as measured by an informal test of language skills such as comprehension, expression, and recognition of correct syntax. Finally, based on scores from the *Survey of Study Habits and Attitudes* the researchers found that the students with LD who had graduated had higher levels of motivation and more positive attitudes toward the learning process than did students with LD who had not graduated.

This study is important in that it highlights some of the differences and similarities between college students with LD and those without LD in terms of pre-college characteristics and academic outcomes during college. However, the study suffers from methodological weaknesses, including inadequate sample and instrument description. For example, the authors do not provide any information regarding the technical adequacy of their measure of oral language skills. Further, they do not provide sample size information for the subgroups they analyzed, with the exception of the LD graduate subgroup. Another concern regarding their analysis of data is their inclusion of seven students not part of the original study and not from the same college in an effort to increase their sample size and analyze differences between students with LD who graduated and those who did not. Such a practice calls into question the validity of their results.

In a follow up study, Vogel and Adelman (1992) compared individuals with LD to their non disabled peers on a number of cognitive and academic variables. In this study

a sample of 62 students with LD was matched to a sample of 58 students without

disabilities on the basis of *ACT* scores and gender. The samples included individuals

between the ages of 18 and 25 who had attended the college for at least one semester

between 1980 and 1988. Every participant had taken, per college policy, a reading

comprehension test and a test of knowledge of sentence structure, as well as provided a

writing sample. On each measure, the non-disabled sample scored significantly better

than the LD sample. Although IQ scores were not available for the non-disabled sample,

the mean scores for the LD sample were in the average range (FSIQ *M*= 100, PIQ *M*=

102, VIQ *M*= 101; *SD* not reported). The authors did not provide standard scores for

achievement tests taken by the LD sample, but reported mean grade equivalent scores on

subtests ranging from 7.7 (Spelling Recall) to 12.4 (Reading Vocabulary). Other than the

three tests given by the college, there was no achievement test data available for the non-

disabled sample.

The authors compared the two groups on number of core courses and electives

taken in high school, the number of developmental courses taken in high school and

completed with a grade of C or better, the number of D and F grades, and high school

GPA. Results indicated the only significant difference in high school transcripts was that

students with LD took significantly more developmental math courses than the matched

sample. The authors also looked at the relationship of *ACT* scores and high school GPA

with exit college GPA. *ACT* scores were not significantly correlated with exit GPA for

either group. High school GPA was significantly correlated with college exit GPA for the

LD (r = .41) and the matched sample (r = .48). The best correlation to exit college GPA

for the LD group was the number of regular high school English courses taken and passed with a grade of C or better ($r = .46$).

In addition to using high school performance and *ACT* scores to predict exit college GPA, the authors compared the two groups on GPA at the end of each academic year, as well as on the number of credits, D, F, Incomplete, Passing, and Withdrawal grades at exit from college, and graduation rates. The two groups differed significantly in that the LD group had a higher mean exit GPA than the non-disabled group. However, the LD group also took significantly more pass/fail courses than the matched sample. Finally, the authors found that the LD group took significantly lighter course load than the non-disabled group, and though they took one year longer on average to graduate, the difference was not significant.

One methodological issue with this study is the participant selection procedures used. The authors used a matching technique, based on *ACT* scores, to establish the group of non-disabled participants. Using a matching technique may result in the participants being similar in unanticipated and unexplored ways. In this case, both groups had *ACT* scores much lower than what would be expected for a randomly selected group of college students. Thus, the generalizability of the results is questionable. Additionally, the authors were unable to find matches for four of the participants in the LD group with the lowest *ACT* scores; those participants were still included in the study, potentially skewing the data analysis and results.

Affective and behavioral factors. In addition to cognitive and academic factors, other researchers have compared college students with LD to those without LD on affective and behavioral factors. Ryan (1994) compared college freshmen with LD to

those without LD on factors related to life adjustment. Using survey instruments designed for the study, the authors compared the samples on motivation for attending college, residential status while in college, satisfaction with social climate on campus, perceptions of academic difficulty, time spent studying, patterns of course enrollment and academic achievement, and goals and future plans. The study was conducted at a community college in the Midwest. The participants included 39 students with LD and 33 without; all were freshmen. The authors administered one or more of the surveys at four points during the participants' freshmen year (September, December, March, and June).

The authors reported no significant differences between the groups' in terms of motivation for attending college or expectations of academic and social adjustment. However, at the beginning of each term the LD group predicted significantly lower GPAs than the non disabled group. Further, at the end of each term, the LD group reported spending significantly fewer hours studying than did the non-disabled group and responses over the course of the year indicated that the self-reported hours spent studying by the LD group decreased, while remaining stable for the non-disabled group. However, there was no difference in mean GPA between the two groups for any academic term.

In addition to academic adjustment, Ryan investigated social adjustment. The college where this study took place was nonresidential, thus students in the study reported either living with family, independently, or with friends. The authors reported that students with LD were significantly more likely to be living with their parents than those without LD throughout the school year. Additionally, the authors reported that significantly more students with LD disclosed being very unsatisfied with their social adjustment compared to the non-disabled group, but the authors did not provide any

statistical analysis of this finding. These findings suggest that the students with LD had different experiences in terms of continued dependency on family and social adjustment in college compared to the sample of students without LD. A major strength of this study is the inclusion of variables from both academic and social domains. The investigation of multiple variables from both domains allows for a broader understanding of the experiences of the participants in this study. However, the small sample size and lack of statistical analysis in some instances are methodological weaknesses of this study.

In another study comparing college students with LD to those without disabilities, Ryan, Nolan, Keim, and Madsen (1999) examined multiple psychosocial factors including self-concept, self-awareness, level of independence, and academic and social adjustment to college. The authors randomly selected and invited to participate in the study 125 students with LD and 125 students without LD from current students enrolled at two colleges in the Midwest. The final sample consisted of 51 students with LD and 59 students without LD. The authors used the *Personal Orientation Inventory* (POI), as well as a researcher-designed instrument to examine psychosocial variables related to college adjustment.

On the researcher-designed instrument there was no difference between the groups in reported confidence regarding academic success, with both groups of students reporting overall high levels of confidence (LD= 86% confidence, NLD= 90% confidence). Further, the self-reported GPAs for the current term of the two groups were not different. Finally, in terms of future goals, the group means were not different for those with plans to obtain bachelors, masters and doctoral degrees. Not surprisingly, there were significant differences found between the two groups in reported levels of need for

support. The LD group reported needing higher levels of academic support and personal counseling.

There were three areas of significant difference between the groups' scores on the POI. The authors describe the POI as a measure of the difference between a person's perceived values and attitudes and the values and attitudes of a self-actualized person. A self-actualized person is defined as one who functions at a higher capacity and lives a more enriched life than the average person. The non-disabled group had significantly higher mean scores on the Self Actualizing subscale and the Acceptance of Aggression subscale and significantly lower mean scores on the Feeling Reactivity subscale. There were no other differences in subscale scores (e.g., spontaneity, self-acceptance, self-regard, and synergy).

There are many limitations to this study. Of primary importance, the authors provide no information about the psychometric properties of the instruments used. Although they report that students with LD have lower mean scores on Self Actualizing and Acceptance of Aggression subscales and a higher mean score on Feelings of Reactivity, very little information about what these subscales measure is provided. Further, they do not provide examples of questions from the subscales. However, they draw strong conclusions based on their findings. For example, the authors write, "…the Acceptance of Aggression Scale (A) measures a person's ability to accept one's own aggression as natural." (p. 9). The authors continue in the discussion to claim that the lower scores of the LD group on this subscale indicate that students with LD are more likely to deny feelings of anger and aggression, resulting from low self-esteem and locus

of control issues. Due to the lack of information about the instrument, particularly the validity, the value of the subscales or relevance of the significant findings is tenuous.

The final study in which researchers compare college students with LD to those without is in relation to students' self-concept and perceived social support. Fifty college students with LD were compared with 50 college students without LD at the University of California, Santa Barbara on measures of self-esteem, academic self-perceptions, nonacademic self-perceptions, and levels of social support (Cosden & McNamara, 1997). Using the *Self-Perception Profile for College Students* and *People in My Life* scales, the researchers found that students with LD and those without disabilities differed in some instances on their self-perceptions and reported levels of support. Students with LD had lower perceptions of their cognitive abilities and academic skills than did students without disabilities. Additionally, students with LD reported higher levels of support from friends and campus organizations. However, the two groups did not differ on reported level of support from parents or faculty members. Further, no differences were found between the groups in ratings of global self-worth or nonacademic competencies. For both groups, support from campus organizations and support from instructors were significantly correlated to global self-worth.

In a secondary analysis, the authors conducted multiple regression analyses to determine the relationship between perceived competencies to global self-worth. For each group the authors included only those variables which were significantly correlated at the p<.01 level. For the LD group the self-perceptions included in the equation were intellectual ability, scholastic competence, job competence, appearance, romantic relationships, close friendships, and morality. The equation was significant, accounting

for a total of 50 percent of the variance in global self-worth. For the group without LD creativity, intellectual ability, scholastic competence, job competence, appearance, romantic relationships, social acceptance, and morality were entered into the equation. This equation was also significant, accounting for 65 percent of the total variance in global self-worth. Despite the significant equations, the authors note that perception of appearance was the only significant predictor of global self-worth for both groups. The authors did not conduct multiple regression analyses for social support factors because only support from instructors for the LD group, and support from campus organizations for the non LD group, were significantly correlated with global self-worth at the p<.01 level.

This study has potential significance because of the authors attempt to compare college students with LD to those without LD on a number of variables unique to the LD college student literature (i.e., support from campus organizations and faculty). However, methodological limitations, such as small sample size and lack of information about the validity of the instruments used weaken the generalizability of their findings.

In summary, college students with LD differ from their non disabled peers on a variety of factors. Each of the studies suffers from methodological weaknesses such as small sample size and description (Cosden & McNamara, 1997; Ryan, 1994; Vogel & Adelman, 1990), poor instrument description (Cosden & McNamara; Ryan, et al., 1999), and failure to report strength of association or effect sizes by all authors. Despite these weaknesses the researchers have documented that individuals with LD enter college with weaker pre-college characteristics, such as lower *ACT* scores and lower scores on tests of achievement, and in some instances differences in high school preparation (Vogel &

Adelman, 1990; 1992). Not surprisingly, students with LD also report needing greater

levels of support in college (Ryan, 1994; Ryan, et al., 1999; Cosden & McNamara, 1997).

Despite these differences, students with LD and those without also share important

similarities. For example, the motivation of students with LD to succeed in college and

their long term goals for educational attainment are comparable to that of their non-

disabled peers (Ryan, 1994; Ryan, 1999). The results are contradictory regarding

academic achievement in college. Although Vogel and Adelman (1990) reported

significantly lower GPAs for the LD group, Vogel and Adelman (1992) found their LD

samples to have higher mean college GPAs than the non-disabled groups and Ryan

(1994) and Ryan, et al. (1999) found no differences in GPA between the groups. Finally,

analyses of variables related to college success in these studies indicate that traditional

predictors, such as *ACT* scores, alone are not enough to predict success in college for

individuals with LD. None of the authors used *SAT* scores, currently a more commonly

used entrance exam, as opposed to the *ACT*, in their analyses of differences between

college students with LD and those without.

    Descriptive and correlation studies. In order to understand what unique factors

may contribute to the academic success of college students with LD, researchers have

made efforts to study a variety of variables related to academic success for this

population. Much like the research comparing college students with LD to those without,

authors have chosen generally to focus either on academic and cognitive factors, such as

prior high school preparation, IQ, and achievement scores or on more affective and

behavior variables such as time spent studying and attitudes and beliefs about college.

Greenbaum, Graham, and Scales (1995) interviewed 49 adults with LD about

their college experience. All of the participants in this study had been students at the

University of Maryland, College Park (UMCP) at some point between 1980 and 1992 and

had been registered with the Disability Support Service office during their time in

college. Each participant was interviewed over the phone about their experience as an

undergraduate. Results from the interviews indicated that the participants had varying

college experience prior to their attendance at UMCP. While 33% began their

undergraduate education at UMCP, the remaining 67% had transferred from a community

college, other large public institution, a college with a program specifically for students

with LD, or from a small private college. The participants also had quite varied majors

during their time at UMCP, spread among eight of the nine colleges at the university. The

majority of the participants, 41 of the 49, had been identified with an LD prior to entering

college and 86% had used one or more accommodation while attending UMCP. Ninety

percent of the participants had completed a college degree, though only 67% completed

their degree at UMCP.

The researchers asked the participants what was most and least helpful during

college. While over half of the participants cited testing accommodations as most helpful,

there was not a consensus about the least helpful accommodations. Less than one percent

of students rated five different accommodations negatively. In addition to

accommodations, the participants were asked about other things that helped or did not

help in college. Thirty-seven percent of the participants cited their own motivation and

determination, 20% cited the support of friends and families, and 18% recalled the

personal attention of a faculty or staff member. Comments regarding what was least

helpful were more varied, but focused on faculty or campus environment issues as perceived by the student (e.g., bureaucracy, size of campus, lack of support etc.) or on personal behaviors (e.g., partying too much, lack of motivation).

One limitation of this study is that the authors only reported frequencies and did not conduct any tests of significance. Analysis of between group differences would have strengthened the study. For example, whether or not the participants who began their college career at the university differed from those who began elsewhere or if graduates of the university differed from the non graduates in their perceptions of the factors that were helpful during their time as a students may have provided further insight into the experiences of various subgroups of the population.

Similar to their earlier work, Vogel and Adelman (1993) focused on academic and cognitive factors as predictors of success for college students with LD. The authors compared 36 graduates with LD to 23 individuals with LD who had dropped out or had been dismissed from college due to academic failure (GPA less than 2.0). The study took place at a college in the Midwest. Although the graduate group (G) was significantly older than the non graduate group (NG), the two groups did not differ on *ACT*, IQ, or achievement scores in the areas of reading, writing, or math. The authors used questionnaire data and document review to examine high school preparation, previous educational and psychological interventions, and prior college experience.

Results of this study showed that the graduates and non graduates did not differ in relation to when their disability was first noticed by parents or professionally evaluated. An analysis of types of interventions provided to the students showed that non graduates were significantly more likely than graduates to have been in a self-contained placement

at some point during their K-12 schooling. Of those who received private tutoring (36% of graduates and 30% of non graduates), those in the graduate group were tutored privately for a significantly longer period of time. In terms of other interventions, data analysis revealed that the same proportions of individuals in the two groups had resource room placements, remedial reading help, psychological support, repeated a grade, and attended a special education summer camp.

The authors also compared the groups on the number of regular high school English and math courses taken and completed with a grade of C or better, as well as on the number of D and F grades earned. The only difference between the two groups was that the graduates took significantly more English courses than did the non graduate group. Participants in the non graduate group were more likely to have begun as freshmen at the current college, whereas the graduates were more likely to have attended another college prior. Findings from this study indicate that educational placement in the K-12 setting, duration of private tutoring, number of regular English courses taken and passed with a C or better in high school, and prior college attendance differentiate college graduates with LD from non graduates with LD; whereas traditional indicators such as *ACT*, IQ, and achievement scores were not good discriminators between college completers and non completers.

A strength in the design of this study is the control for covariates such as IQ, *ACT*, and achievement scores. By doing so, the authors avoided the risk of finding differences between the groups due to these factors, rather than the variables being investigated. One methodological weakness of this study is the small sample size. Another limitation of this study is the authors' failure to adequately describe and quantify some of the variables in

their study. For example, they categorized prior educational interventions such as remedial reading, resource room, speech therapy and camp as potential protective or risk factors. However, they only listed the interventions in tabular form, without descriptions of the intervention or information regarding the duration of the intervention (e.g., type of reading remediation or number of years or hours a day spent in resource room).

Other researchers have focused on affective and behavioral factors related to the academic success of college students with LD. Ashton-Coombs (1993) investigated the relationship between self-reported work habits and the academic success of 25 students with LD ranging in age from 18 to 45. All participants attended San Diego State University and were registered with the Disabled Student Services on campus. Using a ten item instrument developed for the purpose of this study, the author interviewed each student. The ten questions were yes or no response items based on a list of appropriate study skills and work habits identified by regular and special education teachers as very important in secondary mainstream setting.

The author reported that only four of the ten skills and habits were reported as acquired by 70% or more of the sample. These were: attend class regularly (96%), bring necessary materials to class (88%), complete homework (80%), and demonstrate an adequate attention span (72%). The items least frequently reported as acquired were the ability to communicate needs (28%) and ask for help when appropriate (44%). In addition to reporting frequencies of each item, the author reported students' self-rating by GPA. Ashton-Coombs blocked GPA into three categories: 3.0-4.0, 2.0-2.99, 1.0-1.99 and then blocked overall ratings of study skills and habits into three categories based on number of self-reported acquired skills: low (1-3), medium (4-7), high (8-10). Twenty-two of the

twenty-five students fell into the middle category of acquired skills, and the remaining three fell into the high category.

Though this study provides a surface level glimpse at self-reported study skills and habits of college students with LD, the study itself is fraught with methodological problems. First, the author provides no information regarding the reliability or validity of the instrument used. Second, the small sample size, variability in age, and the fact that none of the participants was diagnosed with an LD until college limits the generalizability of the findings that are present and precludes the author from conducting tests of significance to determine the relationship, if any, in reported skills and GPA. Finally, the conclusions drawn by the author on the ease or difficulty of acquiring various study skills and habits by students with LD is unfounded based on the data available.

Keim, McWhirter, and Bernstein (1996) explored the relationship between the use of academic support services and college GPA for students with LD. Focusing on a sample of 125 students with LD at a large university in the Southwest the author studied the number of advising contacts, use of computer lab, average number of hours spent in tutoring, and average number of test accommodations used within a semester in relation to cumulative GPA. A separate analysis was conducted for each independent variable. In each case the variables were divided into three categories: high level, low level, and no use.

Findings indicate that students who had low levels of advisor contact had higher GPAs than those with no or high levels of advisor contact. Although this finding is counterintuitive, it is plausible that students with higher levels of advisement may be seeking advisement due to current or past academic difficulties. Students with high levels

of computer lab use had higher GPAs than those with no or low levels of use of the

computer lab. Neither use of tutoring, nor use of test accommodations were significantly

related to GPA. Because the sample represented students across class standing, the

researcher controlled for class standing in each analysis and found no significant

interaction between class standing and any of the four independent variables.

The final study addressed here is unique in that the authors combine cognitive,

academic, and affective factors to predict GPA of college students with LD. Murray and

Wren (2003) used IQ, achievement scores, and a measure of study skills and attitudes to

predict the GPA of 84 college students with LD. The sample included both graduate (4%)

and undergraduate (96%) students. The undergraduates had completed at least 20 college

credit hours; the number of credit hours completed was entered as a control variable in

the data analysis. A review of documentation yielded information about IQ and

achievement scores. Domains of study skills and attitudes were assessed using the *Survey

of Study Habits and Attitudes*. This instrument has four subscales assessing work

methods, teacher approval (related to positive or negative views of teachers),

delay/avoidance behaviors, and educational acceptance (related to positive or negative

views of educational endeavors).

Results from this study showed that only FSIQ and Delay/Avoidance scores were

significant predictors of GPA. FSIQ accounted for 6% of the total variance, while

Delay/Avoidance accounted for 5% of the total variance in GPA. A major strength of this

study is the inclusion of variables from multiple domains (e.g., cognitive, academic, and

affective). One weakness of this study is the small sample size and the characteristics of

the sample. The participants included students with as few as 20 credit hours completed

to graduate students. However, the authors did not conduct any sort of analysis of between group differences, leaving the question of whether the variables studied would account for different amounts of variance in GPA for freshmen as they did for juniors or graduate students.

In sum, descriptive and correlation studies of factors related to the success of college students with LD are quite varied in focus. While some researchers focus on cognitive and academic variables (Vogel & Adelman, 1993), others focus on affective and behavioral variables (Ashton-Coombs, 1993; Cosden & McNamara, 1997; Keim, et al., 1996). Only one study was found in which cognitive, academic, and affective factors were not studied in isolation (Murray & Wren, 2003). Methodological weaknesses such as small sample size (Ashton-Coombs; Murray & Wren; Vogel & Adelman, 1993), inadequate control of potential covariates (Keim, et al.; Murray & Wren) and insufficient statistical analysis (Ashton-Coombs; Greenbaum, et al.) are present in the studies reviewed here. Despite these weaknesses, the studies reveal potential significant variables related to the academic success of colleges students with LD. When taken in total, findings suggest that a comprehensive model accounting for a combination of cognitive, academic, affective, and behavioral factors should be considered to explain the academic success of college students with LD. None of the variables studied in isolation (e.g., *ACT*, high school preparation, work habits, use of accommodations) satisfactorily explain academic success or failure of college students with LD.

College Student Retention and Success

Several studies have been conducted which focus on factors related to the academic success, as measured by GPA, and retention of college students. Researchers

have utilized a variety of methods to isolate student characteristics, perceptions, and experiences which impact college GPA and retention. The paradigmatic status of Tinto's model of student retention is evidenced in the number of studies in which researchers have attempted to verify, modify, explain, or measure all of or parts of the model, in particular social and academic integration. For the purpose of this review of literature, studies focusing on college student success and retention were divided into two categories (a) studies focusing on GPA as the dependent or criterion variable, and (b) studies focusing on retention as the dependent or criterion variable.

 GPA as the outcome variable. Wolfe and Johnson (1995) examined *SAT* composite scores, high school GPA, and personality variables as predictors of college GPA for a sample of 201 college students at a state university in New York. The authors utilized four instruments to measure personality, yielding 32 personality variables. Three of the instruments are well documented instruments used for measuring personality variables: the *Jackson Personality Inventory (JPI),* a modified version of the *Multidimensional Personality Questionnaire (MPQ)*, and the *Big 5 Inventory*. The other instrument was developed for the study to assess variables associated with GPA such as self-efficacy, academic procrastination, and class attendance.

 Results of the correlation analysis show that high school GPA is strongly and significantly correlated with college GPA ($r= .40$). As well, *SAT* composite score yields a strong significant correlation with college GPA ($r=.34$). Of the 32 personality variables, 14 were significantly correlated with college GPA. The authors conducted a forward entry multiple regression analysis for each personality inventory separately. In each of the four analyses, high school GPA, a self-control variable, and *SAT* score account for

approximately one-third of the variance in college GPA. In each case high school GPA

entered first accounting for 19 percent of the variance in college GPA. Second, a

personality variable, described as a self-control characteristic by the authors, entered the

equation accounting for and additional seven to nine percent of the variance, depending

on the inventory used. The self-control personality variables found to exert significant

influence in each analysis were Organization (*JPI*), Control (*MPQ*), Conscientiousness

(*Big 5*), and Self-efficacy (Other). The final variable accounting for a significant portion

of the variance in college GPA was *SAT* scores, which accounted for an additional three

to five percent of the variance, depending on the personality inventory used.

The generalizability of this study is limited by the minimal details provided about

the procedures and demographics of the sample (e.g., year in school). As well, the

authors do not provide information about the reliability and validity of the measures

which they modified or developed for the purpose of the study. Despite its weaknesses,

this study is important for several reasons. First, it highlights that *SAT* scores contribute a

small, but significant amount of variance to college GPA above and beyond the

contribution of high school GPA. As well, taken in total the results of each separate

regression analysis, as well as the inter-correlations among the variables, indicate that

self-control, in various forms (i.e., organization, control, conscientiousness) is an

important personality characteristic related to GPA for college students. Finally the

relationship between high school GPA and college GPA indicates that despite differences

in grading practices and differences high school curricula, high school GPA is a strong

predictor of college GPA.

In another study investigating the relationship of personality variables and college GPA, Tross, Harper, Osher, and Kneidinger (2000) administered the *College Adjustment Inventory (CAI)* during the first week of class to 844 freshmen at a large, public university in the southeastern United States. In addition to the three personality constructs of Achievement goals, Conscientiousness, and Resiliency assessed by the *CAI*, the authors included high school GPA and *SAT* scores in a multiple regression analysis to predict first year cumulative GPA and retention from freshmen to sophomore year.

The authors found that all of the past achievement and personality variables were significantly correlated with college GPA. However, only high school GPA, *SAT* scores, and Conscientiousness were found to be significant predictors in the regression equation. Combined, these factors accounted for 36% of the total variance of freshmen GPA. High school GPA accounted for 25% on its own, Conscientiousness accounted for an additional 7%, and *SAT* for the remaining 4%. Interestingly, only Conscientiousness was a significant predictor of persistence, accounting for 3% of the variance. None of the other personality variables, nor high school GPA or *SAT* scores significantly predicted retention.

The interpretation of the results would be enhanced by a better description of the constructs of Achievement, Conscientiousness, and Resiliency. Although the authors conducted principle components analysis to confirm the measurement properties of the scale, the authors failed to define the constructs, but rather provided sample items for each subscale. It would appear based on the sample items that Achievement reflects educational and professional goals, Conscientiousness reflects the day to day academic behavior of a student such as turning in assignments on time and effectiveness of note

taking, and some of the Resiliency items reflect perceived stress. Importantly, scale reliabilities ranged between .75 and .85. In sum, this study provides further evidence that college GPA is impacted by more than past academic performance.

In their study, Beck and Davidson (2001) assessed whether scores from the *Survey of Academic Orientations (SAO)* were valid predictors of first-semester freshmen GPA for a sample of 536 freshmen at a university in the southeastern United States. The authors specifically wanted to know if *SAO* scores were significant predictors of GPA after accounting for high school percentage rank and *SAT* score. The *SAO* has six subscales related to creativity, dependence, academic apathy, reading for pleasure, academic efficacy, and trust of instructors. Participants completed the *SAO* in small groups between the third and seventh week of school. High school rank, *SAT* scores, and semester GPA were obtained with student permission from the office of the registrar.

Results of this study validated the use of the *SAO* as a means to predict first semester GPA. The model containing all six subscales accounted for a significant 17 percent of the total variance in GPA, academic efficacy and academic apathy were the best predictors. When taking into account high school percentile rank, *SAT* math and verbal scores and all six subscales, the full model accounted for 30 percent of the variance in GPA. The six subscales accounted for 11 percent of unique variance above and beyond that of high school percentile rank and *SAT* scores. Similar to the finding of Wolfe and Johnson (1995) and others, high school percentile rank was a stronger predictor of GPA than either *SAT* math or verbal scores. In general this was a well designed study. One notable strength was the inclusion of high school percentile rank and

SAT scores in the regression equation, so as not to overestimate the predictive validity of the *SAO* scores.

In a study of the entire freshmen class (*N*=265) at a small, southeastern private liberal arts college, Boulter (2002) used the *Self-Perception Profile for College Students (SPPCS)* to examine the influence of self-perceptions regarding competencies and abilities, as well as social relationships on first semester GPA. The *SPPCS* is composed of 12 subscales which focus on creativity, intellectual ability, scholastic competence, job competence, athletic competence, appearance, romantic relationships, social acceptance, close friendships, parent relationships, finding humor in one's life, and morality. There are three parts of the instrument; the *Self-perception* scale measures the students self-perception in each domain, the *Importance* scale, measures the importance they attribute to each domain, and the *Social Support* scale measures the extent to which the student views people in his or her life (e.g., parents, friends, instructors) as acknowledging his or her worth as a person. Participants completed the *SPPCS* during orientation, prior to the start of the semester.

Results of a multiple regression analysis with the 12 self-perception subscales and a global self worth score serving as predictor variables showed that Intellectual Ability and Creativity were significant predictors of GPA accounting for 11% of the total variance. A second analysis using scores from the importance subscales indicated that intellectual ability and close friendships were significant predictors of GPA accounting for seven percent of the total variance. A multiple regression analysis using the *Social Support* scale revealed that perceptions of instructor's approval about ones' self was a significant predictor accounting for six percent of the variance in GPA. Although not

directly testing academic and social integration, the findings that perceptions of intellectual ability, close friendships, and instructor approval are related to GPA support the basic presumptions of the importance of academic and social integration as presented in Tinto's theory. The authors also analyzed the results for differences between men and women and found some differences between the groups. For example, when analyzed separately, perceptions of close friendships was a significant predictor of GPA for women. For men, the Instructor domain was no longer significant and the Mother domain became a significant predictor of GPA.

Although this study provides insight into the importance of various self-perceptions on GPA for college students, the methodological flaws require that the results be interpreted with caution. First, the authors do not take into account high school performance or *SAT* scores, known to account separately and in combination for significant variance in college GPA. Additionally, it is unclear what it means that instructor approval is a significant predictor of college GPA for this sample, because the measure was completed prior to the start of school and presumably before any meaningful or consistent contact with college instructors.

Utilizing the Input-Environment-Output (I-E-O) model of college student experience, House (2002) considered input characteristics such as high school GPA, academic self-concept and achievement expectancies in conjunction with environmental variables such as time spent per week in activities such as studying, attending class, and talking with faculty and frequency of participation in activities such as tutoring, research projects, and group projects. In addition, environmental factors such as perception of faculty interest in students, timely completion of homework, and time spent studying in

library were considered. The outcome or criterion variable in this study was self-reported cumulative GPA.

A total of 721 students who had started college five years earlier were surveyed about their college experiences. A description of the size, location, or type of university is not provided by the author. Results indicated that students with higher self ratings of academic ability reported spending more time studying, were more likely to have engaged in tutoring another student, and were more likely to perceive faculty as interested in students. As well, students with higher input ratings (i.e., high school GPA, academic self-concept, and achievement expectancies) and students with higher environmental ratings (i.e., number of hours spent in class and labs, studying, and talking with faculty, likeliness to tutor another student, participate in group project, and perceive faculty as interested in self) reported higher GPAs. Finally, in a regression analysis the authors found that the complete model of input and environmental characteristics accounted for 27% of the total variance in self-reported cumulative GPA.

This study provides further empirical evidence that a variety of variables influence academic achievement in college, including pre-college individual characteristics of the student and environmental or interactional characteristics experienced by the students once they begin college. An obvious weakness of this study is that GPA is self-reported. Although the complete model explains 27% percent of the variance in GPA, there is clearly room for modifications of the model and its variables in order to capture more variance.

One study was located in which the authors specifically applied a construct of Tinto's model, namely academic integration to predict GPA, as well as faculty contact.

Bean and Kuh (1984) investigated the possible reciprocity between student-faculty

contact and GPA, in addition to the impact of seven other variables on both student

faculty contact and GPA. The model contained seven exogenous variables: (a) academic

integration measured by level of motivation, interest, and confidence in student role, (b)

student perception of academic difficulty, (c) intent to transfer, (d) membership in

campus organizations, (e) number of advisor contacts, (f) talking/participation in class,

and (g) high school GPA. The two endogenous variables in the model were faculty

contact and GPA**.** A researcher-developed Likert scale instrument was used to measure

all of the variables, except high school GPA and college GPA which were obtained from

the registrars' office. The measure of academic integration included 11 items regarding

the extent to which a student felt interested, motivated, and confident in his or her role as

a student; with responses ranging from (1) very small extent, to (5) very great extent. The

alpha coefficient for this subscale was .81.

The sample for this study included 1096 freshmen and sophomores at a large,

residential, mid-western university. For data analysis the authors divided the sample into

four distinct groups of freshmen women, freshmen men, sophomore women, and

sophomore men. Using path analysis the authors found, as hypothesized, that all seven

exogenous variables had statistically significant effects on college GPA and faculty

contact for at least one subgroup. In the aggregate, standardized effects ranged from .06

(intent to transfer) to .35 (advisor contact) for faculty contact and from -.08 (academic

difficulty) to .48 (high school performance) for college GPA. High school GPA and

academic integration had the most consistent influence on GPA for all groups. Contrary

to the researchers' hypothesis, the effects of faculty contact on GPA and GPA on faculty

contact were not statistically significant for any group. These findings are interesting in that student-faculty contact is a key component of the construct of social integration and is also considered to be associated with academic integration (Tinto, 1993).

An additional finding of interest concerns the construct of academic integration. While Tinto and others typically include GPA as a component of academic integration these authors did not. Rather, Bean and Kuh hypothesized that, contrary to Tinto's assertion that GPA is a precursor to academic integration, academic integration may in fact influence GPA. The findings in their study seem to support this notion, with academic integration being a consistently strong predictor of GPA. The authors' large sample size and analyses of results in the aggregate, as well as for the subgroups of freshmen and sophomore men and women are methodological strengths of this study, allowing for more confidence in the results.

In summary, research in which the focus is college GPA as the outcome variable has yielded significant findings using a variety of predictor variables. Some of the studies suffer from methodological weaknesses such as poor sample description (Wolfe & Johnson, 1995), poor construct definition (Tross, et al., 2000) or weaknesses in measurement procedures or instrument description (Boulter, 2002; House, 2002; Wolfe & Johnson). In three of the six studies reviewed the authors focused solely on the characteristics of the individual. Whether using personality, self-perceptions of academic and social competencies, or academic orientation, the complete models, including high school performance and *SAT* scores, accounted for no more than one-third of the total variance in college GPA. While these studies tell us that high school performance is a strong, consistent predictor of college performance and that a variety of other individual

characteristics are significant predictors, none provides a comprehensive model. The inclusion of environmental (House) and interactional (Bean & Kuh; Boulter) factors in the study of GPA as an outcome variable are important additions for better understanding the broad picture of college student academic success.

Retention as the outcome variable. In addition to studying GPA as the outcome variable, several authors have undertaken research with retention or persistence as the outcome variable of interest. In an attempt to test Tinto's model, Pascarella and Terenzini (1980) conducted a longitudinal study to determine whether a measure of academic and social integration would significantly discriminate between persisters and nonpersisters when background characteristics known to impact college success such as high school percentile rank, *SAT* scores, educational goals, expected faculty contact, parents' income and education, and initial institutional commitment were held constant. The sample consisted of 773 freshmen at Syracuse University. The authors randomly divided the original sample into a calibration sample, consisting of two-thirds of the participants ($n=$ 497) and a cross-validation sample ($n=$ 266). All participants completed surveys prior to the start of the fall semester of freshmen year and during the spring semester of freshmen year. The initial survey captured background characteristics of the students, as well as their expectations for college. The *Institutional Integration Scale (ISS)*, given in the spring semester, was developed for this study and designed to capture social integration, academic integration, and institutional commitment. The instrument is a self-perception scale composed of 34 items on five scales addressing peer-group interactions, interactions with faculty, perception of faculty concern for student development and teaching, academic and intellectual development, and institutional and goal commitment.

Responses ranged from (1) "strongly disagree", to (5) "strongly agree". Alpha

reliabilities ranged from .71 for institutional and goal commitments scale to .84 for peer

group interactions scale.

Results indicated that of the 773 participants 10 had been academically dismissed

and 90 had voluntarily withdrawn from school by the beginning of their sophomore year.

The authors excluded those dismissed for academic reasons from analysis. Scores from

the *ISS* accounted for 21% of the variance in withdrawal above and beyond the

background characteristics of the students. In addition, each scale significantly

discriminated persisters from non persisters, with persisters scoring higher on each scale.

Background characteristics alone correctly classified only 62% of the calibration sample

and 56% of the cross-validation sample, whereas the *ISS* alone correctly classified 80%

of the calibration sample and 79% of the cross-validation sample. In addition to

demonstrating the predictive validity of the *ISS*, this study supports the validity of the

influence academic and social integration and institutional commitment on student

persistence. A particular strength of this study is the authors' statistical control of a

number of known correlates to persistence, allowing for a more reliable interpretation of

the association between academic and social integration and persistence.

In a secondary analysis of the data from this study, Pascarella and Terenzini

(1983) used path analysis to determine the effects academic and social integration had on

institutional commitment and persistence. Additionally, the authors investigated the

hypothesis that a compensatory relationship exists between academic and social

integration. Findings from this study revealed that academic and social integration had

both indirect and direct effects on persistence. Academic integration directly influenced

goal commitment (beta = .15), which in turn influenced persistence (beta = .08). Both academic and social integration had direct effects on institutional commitment (beta = .18 and .12, respectively), which in turn influenced persistence (beta = .23). In the complete model, the direct effects of social and academic integration on persistence were approximately equal (beta = .14 and .19, respectively). Additional analysis exposed a compensatory interaction between academic and social integration. Social integration had a stronger direct effect on persistence when academic integration had a relatively weaker influence and vice versa. For example, the authors reported that for women in the sample social integration exerted a stronger direct effect than did academic integration, the reverse being true for men.

This study is important in that it provides empirical support for the two core concepts of Tinto's theory, academic and social integration. In addition, the investigation of the compensatory nature of social and academic integration is informative for thinking about groups of students who may be more likely to become integrated in either the social or academic system of an institution. However, the results must be considered cautiously in that the sample for this study was drawn in 1976, thus the differences between men and women in terms of integration may not be reflective of today's students.

In an attempt to test a model combining Bean's organizational and Tinto's interactional models, Braxton and Brier (1989) conducted a longitudinal study of the retention of 104 freshmen at a Midwestern commuter university located in an urban setting. Persistence from freshmen year to sophomore year was the dependent variable; while background characteristics including high school percentile rank, gender, race, and

SES, initial commitment to the university, academic and social integration, subsequent commitment to the university, and organizational attributes of the university including institutional communication, fairness of policies, and participation in decision making were independent variables. In order to assess academic integration the authors used a composite of three variables: (1) freshman year GPA; (2) Seven items drawn from the Institutional Integration Scale (ISS) (Pascarella & Terenzini, 1980) assessing self-perception of academic and intellectual development (alpha coefficient = .53); and (3) Five items, also drawn from the ISS, assessing a students perception of faculty concern for teaching (alpha coefficient = .63). Social integration was measured using a composite of two scales: (1) Seven items drawn from the ISS assessing peer group interactions; and (2) Five items drawn from the ISS measuring self-perception of interaction with faculty. Alpha estimates for the scales were .66 and .85, respectively.

The authors conducted path analysis to test the model including all of the variables. The authors found partial support for Bean's proposition that the organizational attributes of a university impact student experiences. Some of the organizational attributes had significant, direct, positive effect on academic and social integration. However, none of the organizational attributes had significant direct or indirect effects on subsequent institutional commitment or student persistence. The results also indicated mixed results for Tinto's propositions concerning the importance of academic and social integration. While academic integration had a positive, direct effect on institutional commitment (beta = .33), social integration had no significant effect on institutional commitment. Further, subsequent institutional commitment was the only variable with a statistically significant direct effect on student persistence (beta = .30), while academic

integration was the only variable that showed a statistically significant indirect effect

(beta = .10).

Though the study is limited due to its small sample size, the results provide mixed

support for combing organizational and interactional models of student persistence.

Although the organizational attributes of the university do not, in this study, exert direct

influence on student withdrawal decisions, the influence that organizational attributes

have on social and academic integration provide evidence for the importance of

considering variables beyond the individual characteristics of the student.

Cabrera, Nora, and Castaneda (1993) similarly investigated a combined model of

student persistence using Tinto's interactional model and Bean's student attrition model.

Rather than focusing on the organizational attributes of the university and their influence

on student persistence, the authors applied Bean's argument that factors external to the

university also impact persistence, a concept which Tinto is often criticized for ignoring

(Braxton, Hirschy, & McClendon, 2004, Shields, 1994). The combined model tested in

this study included four constructs from Tinto's model: academic integration, social

integration, institutional commitment, and goal commitment. From Bean's model the

authors included two variables: encouragement from parents and friends and financial

attitudes. In addition, GPA was included in the model as a factor separate from academic

integration. Finally, intent to persist and persistence were the outcome variables.

The authors employed a longitudinal design for this study, collecting data in the

spring of the students' freshmen year and fall semester of their sophomore year. In the

spring of freshmen year the participants completed a researcher-designed survey to assess

academic and social integration, institutional and goal commitment, perceptions of

encouragement from friends and family and financial attitudes. There were a total of three items measuring academic integration, two of which were academic self-perception and satisfaction items drawn from the ISS (Pascarella & Terenzini, 1980) and the other was regarding satisfaction with courses. Social integration was measured with two items drawn from the ISS, both assessed students perception of interaction with peers. At the end of the spring semester the researchers obtained GPAs for all students and at the beginning of the fall semester the researchers determined which students returned to the university and which did not based on the records from the registrars' office. In total, 466 full time freshmen from a large southern, urban university participated in the study.

The authors employed structural equation modeling to determine the effects of the environmental and interactional factors on intent to persist and persistence behavior. The authors found that the integrated model accounted for 42% of the total variance for intent to persist and 45% of the total variance for persistence. The largest total effect on persistence was intent to persist (beta = .48) followed by cumulative GPA (beta = .45). Both the environmental factors and the interactional factors included in the model had significant direct effects on persistence. Thus, the results of this study support the interactional constructs from Tinto's model and the environmental constructs from Bean's model as important factors in student persistence. Further, the combination of the models appears to provide a stronger model of student persistence. One weakness of the design of this study is the failure to account for background or individual characteristics such as prior academic achievement.

In another attempt to improve on Tinto's model, Milem and Berger (1997) combined aspects of Tinto's interactional model with Astin's theory of involvement. The

authors surveyed 718 freshmen at a highly selective, private university to collect

information about the students' background characteristics, initial level of commitment to

the institution, behavior and involvement in the fall and spring, perceptions of campus

life in the fall and spring, academic and social integration, and institutional commitment

in the spring. The authors surveyed the students in August, October, and March, using

three instruments: the *Cooperative Institutional Research Program (CIRP) Student*

Information Form (SIF), The Early Collegiate Experiences Survey (ECES), and the

Freshmen Year Survey (FYS). There are a total of 162 items on the FYS, 18 of which are

related to academic and/or social integration. The instrument was developed by the

researchers, directly from the *ISS* (Pascarella & Terenzini, 1980) and in part assesses a

student's self-perception of his or her academic and social integration. Alpha estimates

for the academic integration subscale and social integration subscale are .74 and .72,

respectively (Berger & Milem, 1999). The dependent variable for this study was intent to

persist, measured with three items assessing the students' likeliness to re-enroll for the

next term.

The findings of this study suggest that aspects of Astin's theory of student

involvement and Tinto's interactional theory are relevant for student persistence. Results

of a path analysis revealed that early involvement with peers in the fall semester had a

statistically significant direct effect on perception of institutional support (beta = .09) and

peer support (beta = .22). Whereas involvement with faculty in the fall semester had a

statistically significant, strong, positive direct effect on perception of institutional support

(beta = .32) and a weaker negative direct effect on perception of peer support (beta = -

.08). Unlike Tinto's assertion that both academic and social integration influence

institutional commitment and thus persistence, the results of this study indicate that academic integration had no impact on institutional commitment or intent to re-enroll, while social integration was a positive predictor of institutional commitment (beta = .31) and intent to re-enroll (beta = .13). Results from this study must be generalized cautiously as the sample is very unique in that it is drawn from a highly selective, private university and the sample of students likely does not represent college students nationally in terms of academic competencies. Thus, the influence of social integration and not academic integration on student persistence may be a result of the lack of variability of academic integration for this sample.

Kahn and Nauta (2001) utilized the Social Cognitive Career Theory (SCCT) framework to study the influence of self-efficacy, outcome expectancies, and performance goals, in addition to academic ability and performance as predictors of persistence from freshman to sophomore year. The sample for this study was 400 freshmen attending a large, public, Midwestern university. The authors used the Broad *Academic Milestones Scale* to assess academic self-efficacy and a modified version of a questionnaire from a previous study to measure outcome expectancies. In both cases the authors reported evidence of reliability and validity. However, in order to assess performance goals, the authors used one item from a scale used in another study and did not report reliability or validity. Questionnaires were completed in the summer, prior to students first attending college, and in the middle of the spring semester of the students' freshman year. Thus, pre-college social-cognitive factors and during college social-cognitive factors scores were obtained.

In an analysis including all of the pre-college and during college variables, the results showed that the strongest correlation with persistence from freshmen to sophomore year was second semester GPA ($r = .31$). Pre-college measures of the social-cognitive factors of self-efficacy and performance goals were not significantly correlated with freshmen to sophomore persistence. The second semester social-cognitive factor scores, pre-college outcome expectations, as well as *ACT* scores, high school rank, and first semester GPA were significantly correlated with persistence. Correlations ranged from a high of $r = .25$ (second semester outcome expectations) to a low of $r = .13$ (high school rank and *ACT* scores). The authors also conducted a logistical regression analysis. While the first block including high school rank and *ACT* scores significantly contributed to the prediction of freshmen to sophomore year persistence, the second block including the pre-college social-cognitive factors did not add to the prediction. The final three blocks of first semester *GPA*, second semester social-cognitive factors, and second semester *GPA* each added to the prediction of persistence above and beyond the previous measures.

Although this study provides insight into the relationship of social-cognitive factors, as well as performance factors to persistence, methodological weaknesses are present in this study which needed to be considered. For example, the authors do not provide information about the psychometric properties of all of the measures used in the study. Further, the researchers solicited responses from the first questionnaire one month prior to the start of school, for those who did not respond another questionnaire was sent four weeks later. Based on the timing some of the students responded prior to the start of school and any college experience, while others may have responded after school began.

It is possible that responses to questions regarding academic self-efficacy and outcome expectations differed for the two groups based on their exposure to college courses and demands.

Unlike most studies on student retention and persistence which are conducted at single institutions, Braxton, Vesper, and Hossler (1995) studied variables related to retention with a sample selected from a college choice process study. The participants were all past high school students in the state of Indiana who had participated in a college choice process study as high school students. The 263 participants in the current study represent those who chose to attend a four year college or university. Other than being four year institutions, the authors did not provide information about the colleges attended by the participants.

The authors used structural equation modeling to test a model of persistence with five categories of variables. The variable categories included in the model were: (a) student entry characteristics of gender, ethnicity, SES, and parent support for college, (b) initial goal and institutional commitment, (c) expectations for college in terms of academic and intellectual development, career development and collegiate atmosphere, (d) academic and social integration, and (e) subsequent goal and institutional commitment. The endogenous variable was intent to persist as a proxy for persistence. To assess student entry characteristics the authors relied on surveys given to the students in high school and other data files. The authors used the *FYS* to assess all other independent variables. Five items were taken from the FYS to assess perception of academic integration and four items were taken from the FYS to assess social integration. The

authors did not provide a rationale for why they chose only nine items from the FYS

academic and social subscales, rather than utilizing all 18 of the items.

The authors found that while SES had a statistically significant direct effect on

initial goal commitment (beta = .26) and parental support had a statistically significant

direct effect on expectations for a collegiate atmosphere (beta = .17) and for career

development (beta = .12), the background characteristics of the students had no direct

effects on subsequent commitment, academic or social integration, or intent to persist.

Further, although parental support did have small, but significant indirect effects on

academic integration (.07), social integration (beta = .07), and subsequent institutional

commitment (beta = .07), there were no indirect effects of background characteristics on

intent to persist. Subsequent goal and institutional commitment are the only two variables

which had significant direct effects on intent to persist (beta = .12 and .39, respectively),

while initial institutional commitment (beta = .16), academic integration (beta = .07) and

social integration (beta = .08) had significant indirect effects on intent to persist.

The findings of this study further support the influence of academic and social

integration on intent to persist, as well as the influence of external variables such as

parental support on academic and social integration. There are several limitations to this

study which warrant discussion. First, persistence is not directly measured. However,

intent to persist has been shown to be a strong, consistent predictor of actual persistence

(Bean, 1980). A second limitation is that the authors did not include any control measures

of past academic achievement such as *SAT* or high school GPA as part of the background

characteristics variable set. Finally, the authors used different instruments to measure

initial and subsequent institutional and goal commitment. The reasons for this choice are unclear and raise concerns over whether the same constructs were measured each time.

Titus (2004) conducted a study to examine the influence institutional context has on student persistence. Like Braxton, et al. (1995), Titus' study was multi-institutional. The sample for this study included 5,151 students attending 384 institutions. All of the colleges were 4-year institutions and all of the students were first time, full time degree seeking undergraduates. Data for this study came from the National Center for Educational Statistics (NCES) Beginning Postsecondary Students (BPS 96/98) surveys and the Integrated Postsecondary Education Data System Surveys (IPEDS 95).

The dependent variable in this study was persistence defined as enrolled or graduated after three years of first enrolling in the same four year institution. The independent variables included student characteristics and institutional characteristics. The student characteristics were background characteristics such as high school GPA, gender, and SES; student experiences such as academic performance, residence, involvement, and student-faculty interaction; commitment to earning a degree; and environmental pulls such as financial need and work schedule. Institutional characteristics include student peer group characteristics such as SES and racial ethnic diversity of freshmen enrolled at same university; structural characteristics such as enrollment size, selectivity, and residential status; and student characteristics such as academic performance and student involvement.

Results of hierarchical general linear modeling revealed that both individual characteristics of students and institutional characteristics impact persistence. The findings indicate that the individual characteristics of academic ability as measured by

high school GPA and *SAT* score; educational goals, college GPA, living on campus, and being involved in student activities are associated with persistence. Conversely, minority status, gender, SES and declaring a major were all individual characteristics unrelated to persistence. In terms of institutional characteristics, Titus found that significant correlations of persistence included being a larger school, having greater selectivity, and being a residential campus. Unrelated institutional characteristics included the average educational goal of students, percentage of female students, racial and ethnic diversity of the campus, average SES of student populations, institutional control (public or private status),and average freshmen GPA. The multi-institutional nature of this study provides a clearer picture of institutional characteristics at four year colleges and universities that may impact student retention. This study is significant in that it provides empirical support for the notion that student characteristics alone do not explain retention.

In an attempt to determine the influence of classroom experiences, namely active learning, on social integration, subsequent institutional commitment and students' departure decisions, Braxton, Milem, and Sullivan (2000) conducted a longitudinal study with a sample of 718 freshmen attending a highly selective, Research I university. The authors hypothesized that active learning experiences such as participation in classroom discussions, group work, higher order thinking activities, and exposure to knowledge level exams (negative indicator) would impact a student's level of social integration, institutional commitment, and persistence as measured by a student's intent to return. The authors administered surveys to the participants at three different points during their first year of college in order to assess background characteristics, initial institutional commitment, active learning classroom behaviors, social integration, subsequent

institutional commitment, and departure decision measured by intent to return. During

student orientation, prior to the start of the fall semester, participants completed the

Cooperative Institutional Research Program (CIRP) Student Information Form (SIF),

during the fall semester *Early Collegiate Experience Surveys (ECES)* were mailed to

students at their residence halls, and in the spring semester participants completed the

Freshmen Year Survey (FYS). The authors used items from the *FYS* (Milem & Berger,

1997) to measure social integration. Alpha estimate for the social integration subscale

was .75. The other endogenous variables were measured using a combination of items

from the *ECES* and *FYS.*

Results of a path analysis indicated a variety of direct and indirect effects on

student departure decision were present in the model. The authors found that while some

active learning activities had effects on social integration and institutional commitment,

others did not. For example, participation in class discussions and higher order thinking

activities had statistically significant positive direct influence on social integration (beta =

.21 and .05, respectively). However, group work and knowledge level exams had no

effect on social integration. Participation in class discussions had a small, positive direct

effect on subsequent institutional commitment (beta = .06), while knowledge level exams

had a small, negative effect on subsequent institutional commitment (beta = -.06).

Finally, social integration was found to have a statistically significant, strong positive

direct influence on subsequent institutional commitment (beta = .61). Significant indirect

effects included the impact of class discussion on subsequent institutional commitment

and intent to return, social integration on students' intent to return, and higher order

thinking activities on subsequent institutional commitment and intent to return.

Although the authors did not measure actual persistence behavior, instead using intent to return as a proxy for persistence, the authors documented the strong relationship between intent and actual persistence. Findings from this study support the assertions of Tinto and others that faculty behavior plays a role in influencing student integration and persistence decisions. In fact, three of the four indices of active learning had statistical significant influence on social integration, subsequent institutional commitment, or intent to return. This study provides further support for the notion that student experiences play a role in retention above and beyond student characteristics.

Strauss and Volkwein (2004) employed a cross sectional research design to study factors that influence persistence at two and four year universities. In total 8,217 freshmen from two and four year institutions across the country participated in this study. Institutional level data was collected using the Post-secondary Education Database System (IPEDS-97). Surveys developed for this study were completed in the spring semester of freshmen year by 5,718 students at 28 two year colleges and by 2,499 students at 23 four year colleges. Similar to Braxton, et al. (2000), Strauss and Volkwein did not measure persistence directly, but rather used a proxy, institutional commitment, as the dependent variable. The independent variables were (a) organizational characteristics of the school (e.g., 2 year versus 4 year, size, wealth, productivity), (b) pre-college characteristics of the students (e.g., age, gender, marital status), (c) encouragement from significant others (e.g., perceived family and peer support), (d) financial aid, (e) financial attitudes (e.g., financial stress), (f) social integration and growth, (g) academic integration and growth, (h) college GPA, and (i) student effort. Social integration and growth was measured with four items assessing a student's

perception of peer relationships and social involvement and two items assessing a students perception of his or her social growth, alpha estimates for these scales are .71 and .81 respectively. Academic integration and growth was measured with six subscales assessing (a) classroom experience (8 items; alpha = .86), (b) amount of contact with faculty outside of classroom (1 item), (c) satisfaction with faculty interaction (4 items; alpha = .79), (d) perception of study habits (2 items; alpha = .79), and (e) academic growth and preparation (2 items; alpha = .79).

Relying on earlier models of student retention the authors entered the variables into a regression equation in the order listed above. Results of the regression analysis showed that each of the first seven variables added significantly to the prediction of institutional commitment. In total organizational characteristics, pre-college characteristics, encouragement from others, financial aid, financial attitude, social integration and growth, and academic integration and growth accounted for 49% of the variance in institutional commitment. Further analysis using hierarchical linear modeling (HLM) revealed that academic and social integration are the strongest predictors in this model of institutional commitment. Academic integration, measured in terms of classroom experiences, faculty interaction, and perceived intellectual growth, was the strongest predictor of institutional commitment at both two and four year institutions. The direct effects of the three academic integration measures ranged from a low of .16 to a high of .30 at 2 year colleges from a low of .16 to a high of .28 at four year institutions. Social integration was significant at both two and four year institutions, but stronger at four year institutions (beta = .27 and .31, respectively). In sum, the findings indicate that

the greater level of academic and social growth and integration, the greater level of institutional commitment.

This study is noteworthy both in terms of its design and findings. Drawing a sample from both two and four year institutions allows greater scrutiny into the differential impact various factors have on student persistence at different types of institutions. As well, the large scale of this study allows for greater generalizability. The findings provide further support for the importance of academic and social integration on institutional commitment and thus student persistence. One limitation of this study is the researcher-developed survey had alpha levels that varied considerably for the scales ranging from .60 for the encouragement scale to .86 for the institutional commitment scale.

In summary, research in which the focus is on retention or student persistence as the outcome variable has yielded significant findings using a variety of predictor variables. Consistently the studies reviewed here support Tinto's assertion that academic and social integration are key elements in the student persistence equation (Braxton & Brier, 1989; Braxton, et al., 1995; Braxton, et al., 2000; Cabrera, et al., 1993; Milem & Berger, 1997; Pascarella & Terenzini, 1980; 1983; Strauss & Volkwein, 2004). An interesting finding in some of the studies reflects that the importance of academic integration versus social integration may be dependent on the type of college and students being studied (Braxton & Brier, 1989; Milem & Berger, 1997; Pascarella and Terenzini, 1983; Strauss & Volkwein, 2004). Methodological limitations of these studies include small or very specific samples (Braxton & Brier; Milem & Berger), problems with measurement and instrumentation (Braxton, et al., 1995; Braxton, et al., 2000; Kahn &

Nauta; Strauss & Volkwein, 2004) and failure to control for background characteristics of students (Braxton, et al., 1995; Cabrera, et al.). In total these studies reveal that in addition to individual background characteristics of students, interactional factors such as academic and social integration are important for retention.

Summary

The purpose of this chapter was to provide support for the need to test a more comprehensive model to explain the academic success and retention of college students with LD. Based on the theoretical framework presented and the literature reviewed here several variables emerged as relevant to the investigation of factors contributing to the academic success of college students with LD. Research in the field of LD has suggested that high school achievement and college preparatory exam scores (i.e., *SAT* and *ACT*) are relevant factors related to the academic success of college students with LD (Vogel & Adelman, 1990; 1992). Research on the general college student population supports the notion of the predictive power of prior academic achievement as measured by high school GPA or percentile rank and *SAT* or *ACT* scores on college GPA (Bean & Kuh, 1984; Beck & Davidson, 2001; House, 2002; Tross, et al., 2000; Wolfe & Johnson, 1995). A strong body of retention literature exists which validates the constructs of academic and social integration as central to the persistence of college students (Braxton & Brier, 1989; Braxton, et al., 1995; 2000; Cabrera, et al., 1993; Milem & Berger, 1997; Pascarella & Terenzini, 1980; 1983; Strauss & Volkwein, 2004). Although academic and social integration have not been studied as they relate to the academic success of college students with LD, researchers have documented that successful college students with LD cite related constructs such as positive attitude toward learning, participation in university

programs, connection to other students and college personnel, motivation, and academic and social support as important factors for success (Cosden & McNamara, 1997; Greenbaum, et al., 1995; Reis, et al., 1997; 2000; Ryan, et al., 1999). Thus, a model which includes high school GPA, *SAT* scores, academic integration, and social integration may be more complete for predicting the academic success of college students with LD, than previous models which either exclude interactional variables or study cognitive, academic, behavioral, or affective variables in isolation.

The purpose of this investigation was to study the influence pre-college achievement and college integration variables have on the academic success and intent to persist of college freshmen and sophomores with LD, while controlling for background characteristics, by (a) measuring the relative contribution of past academic achievement, academic integration and social integration on college GPA, and (b) measuring the relative contribution of past academic achievement, academic integration, and social integration on intent to persist. The predictor variables being investigated in this study were high school GPA, *SAT* scores (math and verbal), academic integration, and social integration. The research questions were: (1) Controlling for background characteristics, what are the relative contributions of *SAT* scores (composite), high school GPA, academic integration, and social integration to GPA for college freshmen with LD? (2) Controlling for background characteristics, what are the relative contributions of *SAT* scores (composite), high school GPA, academic integration, and social integration to intent to persist for college freshmen with LD?

Chapter III

Method

The purpose of this investigation was to study the influence pre-college achievement and college integration variables have on the academic success and intent to persist of college freshmen and sophomores with LD, while controlling for background characteristics, by: (a) measuring the relative contribution of past academic achievement, academic integration and social integration on college GPA; and (b) measuring the relative contribution of past academic achievement, academic integration, and social integration on intent to persist. Hierarchical multiple regression analysis was the data analysis procedure used in this investigation. The following chapter describes the setting, participants and recruitment methods, measurement and instrumentation, procedures, and data analysis.

Participants and Setting

The participants for this study were 97 college freshmen and sophomores with LD. The participants were recruited from an available population of approximately 500 students, as estimated by staff at the DRC. There is no consensus on the number of participants needed for multiple regression analysis (Lomax, 2001). However, it is generally understood that more participants yield more power. Further, the greater number of independent variables, the larger the required sample size. Several ratios and formulae are available for estimating sample size. For example, based on seven predictor variables, the recommended sample size includes 78 (Milton, 1986), 111 (Green, 1991), and 70 (VanVoorhis & Morgan, 2001). Based on Cohen's (1988) formula a sample size of 37 would be sufficient for testing the overall significance of a model with 7 variables.

However, a sample size of 102 would be more appropriate for detecting a .10 increase in R^2, with an alpha of .05, when adding the two integration variables to a model containing a block of background characteristics and a block of past achievement variables (Appendix A). Thus, the goal was to recruit 100 participants for this study. One hundred and eight students who self-reported having an LD completed the surveys. Because I could not confirm the disability or the criteria used for diagnosis, the surveys from eleven of the students were discarded and not included in the analysis. All, but one of the students were enrolled in the L.S.C. program, a fee for service program on campus designed to assist students with learning challenges at the university.

Setting. The participants for this study were recruited from a four year university in the southwestern United States. The university is a public research institution and offers over 150 bachelor degrees and 130 graduate degrees. The university enrolls 28,500 undergraduate and 7,400 graduate students. The majority of freshmen live on campus in dorms, while sophomores, juniors and seniors typically live off campus or in fraternity and sorority housing. Sixty-four percent of the total student population is White, 14 percent Hispanic, 5 percent Asian or Pacific Islander, 3 percent Black, 2 percent American Indian, 7 percent non-resident, and 5 percent unknown. Women comprise 53.2% of the undergraduate population, while men make up 46.8% of undergraduate students. Freshmen enrollment in 2005 was 5, 974. The mean high school GPA of 2005 freshmen was a 3.4, while the mean combined SAT was 1122, according to a 2005-2006 University publication. In the same publication it was reported that for the class which entered in the fall of 2004, sophomores at the time this study took place, the mean high school GPA was a 3.4 and mean SAT score an 1118. At the time of the study, the cost of

tuition per semester was approximately $2,375 for in-state students and $7,475 for out of

state students. The cost of L.S.C. services was $2,200 per semester for freshmen and

sophomores.

   Recruitment. Participants were recruited through the Disability Resource Center

(DRC) on campus and through the Learning Strategies Center (L.S.C.). All students with

an LD who wish to be eligible to receive reasonable accommodations under the

Americans with Disabilities Act (ADA) and Section 504 of the Rehabilitation Act of

1973 must be registered with the DRC. Students must provide a current (within three

years) psycho-educational evaluation conducted by a professional diagnostician. The

evaluation must include comprehensive measures of aptitude, achievement, and

cognitive/information processing. Scores from approved measures must be included in

the documentation (see list of measures in Appendix B). According to university policy,

the use of measures other than those recommended by the DRC should be justified by the

diagnostician. It must be demonstrated that the LD limits one or more major life activity,

including learning, currently and substantially.

   L.S.C. is a free standing, fee based program on campus which provides

individualized assistance to students with learning difficulties. Students who are enrolled

in L.S.C. are able to access services beyond the reasonable accommodations guaranteed

to them by Section 504 of the Rehabilitation ACT and the Americans with Disabilities

ACT. L.S.C. students are assigned a learning specialist who provides individualized

support, develops an Individualized Learning Plan (ILP) with the student, and assists in

identifying L.S.C. and campus resources based on the student's needs. Additional L.S.C.

services include unlimited individual and small group content tutoring, mentoring,

consultations with a writing skills coordinator, access to a private computer lab, and

assistance in the form of workshops and seminars targeted at improving skills related to

college success. Workshops are held throughout each semester and include a series of

reading and writing improvement workshops, as well as workshops aimed at test

preparation, organization, communications skills, interviewing skills, and the

management of ADHD and learning disabilities.

Prior to the 2005-2006 school year, in order to receive services from L.S.C.,

students were required to have a disability diagnosis of LD or ADHD, as determined by

the DRC. However, beginning in the fall of 2005, a current psycho-educational

evaluation conducted by a professional diagnostician is no longer required. Although it is

estimated by L.S.C. staff that well over a majority (95%) of the students served by L.S.C.

do have a diagnosed learning or cognitive disability, students who, "demonstrate a

history of learning or attention challenges and who demonstrate a need of individualized

support services at the university level" can now participate in the program.

To obtain a sample of students with documented learning disabilities, I met with

the Assistant Director of the DRC and the Associate Director of L.S.C. to explain the

study and determine acceptable procedures for recruiting participants. Permission was

given by DRC and L.S.C. to recruit participants through listserv emails and by

advertising with flyers posted in the respective buildings. I also met with the Associate

Registrar to confirm university approved protocol for accessing students' records. To

protect students' identities, DRC and L.S.C. sent emails announcing the study and

included my contact information for those who wished to participate, as well as the dates,

times and location of eight sessions for students to attend in order to complete the surveys

and consent forms. Due to space constraint at the L.S.C. Center, all sessions were held in the DRC building. As agreed upon by the Associate Registrar, the Associate Director of L.S.C., the Assistant Director of the DRC, and myself, I worked directly with the DRC to obtain entrance exam scores and GPAs for consenting participants.

The Assistant Director of DRC also agreed to facilitate a second strategy for recruiting participants via a mass mailing, in the event the first strategy was unsuccessful. The Associate Director of the L.S.C. Center initially declined to participate in any further recruitment efforts. The initial recruitment efforts yielded one participant. After the third scheduled data collection session, with no participants, I met with the Assistant Director of the DRC to discuss the implementation of the mass mailing strategy. Upon further discussion regarding the poor response to the electronic requests for participants and the DRC's experience with extremely low response rates to their mailed surveys, I met again with the Associate Director of L.S.C. At this meeting he agreed to allow me to set up a table with an enlarged recruitment flyer in the outer courtyard of the building for a one week period of time, during priority registration. Priority registration occurs one week before standard registration. During this time students with documented disabilities, as well as other campus populations (e.g. student-athletes) are able to register for classes before other students. All students who participate in L.S.C. are encouraged to meet with an advisor during priority registration week for academic advising. Thus, it was believed that this one week period of time was likely to yield the highest number of students with LD passing through the building. The Assistant Director of the DRC agreed that I would attempt this strategy prior to the mailing. Recruiting in front of L.S.C. for one week

yielded 107 more participants. In total, 108 individuals completed surveys and gave consent for me to access their GPAs and college entrance exam scores.

Sample. The sample consisted of 97 freshmen and sophomores with LD. Although 108 students completed the surveys, I was unable to confirm with the DRC the presence of an LD for eleven of the students. Therefore, GPA and *SAT* data was not obtained for these students and their surveys were discarded and not included in the analyses.

Demographic information for the 97 participants who completed the surveys is presented in Table 1. Participants were primarily White (89%), over half of the participants were male (59%), and the majority 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. Of the 97 participants, 54% reported having been diagnosed with ADHD at some point in their life. Based on available data from the university, the research sample had a higher percentage of men and a greater proportion of whites than are represented at the university.

Table 1

Demographic Information

Variable	f / %
Race/Ethnicity	
Black (not Hispanic)	2 / 2.1
White	86 / 88.7
Latino/a	5 / 5.2
Asian or Pacific Islander	2 / 2.1
Other	2 / 2.1
Gender	
Male	57 / 58.8
Female	40 / 41.2
SES (Mother's Level of Education)	
Completed 8th grade	1 / 1.0
Completed high school	8 / 8.2
Some college	14 / 14.4
College degree	45 / 46.4
Graduate degree	29 / 29.9
Areas affected by LD[1,2]	
Reading	61 / 62.8
Attention	54 / 55.7
Writing	45 / 46.4

Math	40 / 41.2
Spelling	27 / 27.8
Handwriting	20 / 20.6
Oral Expression	11 / 11.3
Social Skills	6 / 6.1
Age of Diagnosis[1, 3]	
K and below	6 / 6.2
Primary	32 / 33
Intermediate	15 / 15.5
Middle	13 / 13.4
Secondary	27 / 27.8
Unknown	4 / 4.1
Current Age	
18	20 / 20.6
19	45 / 46.4
20	28 / 28.9
21	3 / 3.1
22	1 / 1.0
Year	
Freshman	58 / 59.8
Sophomore	39 / 40.2
Living Arrangements	
On campus	68 / 70.1

Off campus	25 / 25.8
With parents	4 / 4.1
Diagnosed with ADHD[1]	
Yes	52 / 53.6
No	45 / 46.4

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[1] Self Report

[2] Participants asked to check all that applied

[3] K and below = Pre-Kindergarten – Kindergarten and Ages 3 – 5, Primary = Grades 1 – 3 and Ages 6 – 9, Intermediate = Grades 4 – 5 and Ages 10 -11, Middle = Grades 6 – 8 and Ages 12 – 14, Secondary = Grades 9 – 12 and Ages 15 -18

Descriptive statistics for continuous variables are shown in Table 2. The participants' high school GPA averaged 3.06 (SD =.41). Seventy-one of the participants had *SAT* scores on record, and the remaining twenty-six took the *ACT*. For the participants who took the *SAT*, scores averaged 991 (SD=166), for those who took the *ACT*, scores averaged 19.7 (SD= 3.85). In both instances, these mean scores fell within a standard deviation of the mean scores for the normative samples. The College Board, which designs the *SAT*, publishes the means and standard deviations for the subtests only, thus no composite mean and standard deviation are available for the normative group. However, the *SAT* is designed to have a mean of 500 for both subtests with a standard deviation of 100, resulting in an average composite score of 1000. In 2005 the mean *ACT* composite score was a 20.9 with a standard deviation of 4.9. For analyses purposes *ACT* scores were transformed to *SAT* scores. This is a common practice among admissions offices at colleges and universities (Dorans, 1999). In order to achieve maximum

reliability, I used the same concordance table used by the university where the study took place (Appendix B). After *ACT* scores were transformed, the mean *SAT* score for all participants was 976 (SD = 166). Once the *ACT* scores were converted to *SAT* scores, independent sample t-tests and chi-square analyses were conducted to determine any group differences between students who took the *SAT* and those who took the *ACT*. The two groups were compared on *SAT* scores, high school GPA, college GPA, age, gender, SES, race, presence of ADHD, year in school, living arrangements, intent to persist, and integration scores. To reduce the probability of a Type II error, I used a liberal alpha value of .20. A significant difference between the two groups was found for race (χ^2 = 4.867, *df* = 1, *p* < .05) and year in school (χ^2 = 1.316, *df* = 1, *p* < .20), with the *ACT* group having more minority students and freshmen than the *SAT* group. Of primary importance, the *SAT* group had significantly higher *SAT* score than the converted *SAT* score of the *ACT* group (*t* = -1.545, df = 95, p < .20).

Table 2

Descriptive Statistics for Continuous Variables

Variable	Mean	SD	Range
HS GPA	3.06	.41	2.27-3.98
SAT[1]	976	166	620-1530
Age	19.18	4.5	18-22
College GPA	2.52	.62	.00-3.67
Persistence Average	4.5	.91	2-5

[1]*SAT* scores include transformed *ACT* scores

Measurement and Instrumentation

Five measures and a demographic survey were used for this study. Three of the measures, entrance exam scores (*SAT* and *ACT*), high school GPA, and college GPA were collected, with student consent, from the DRC. Measures of academic and social integration were collected using items from the *Freshman Year Survey (FYS)* (Milem & Berger, 1997). Intent to persist at the university the from the Spring semester to Fall semester was measured with a composite of three items found on the *FYS*. Following is a description and rationale of the measures used in this study.

Demographic questionnaire. Demographic information was collected using a questionnaire designed for this study (Appendix C). The questionnaire asked participants to provide the following information: (a) age; (b) gender; (c) year in school (d) mother and father's level of education; (e) race/ethnicity; (f) major; (g) place of residence; (h) age or grade of initial diagnosis; (i) area(s) most affected by LD; and (j) presence or absence of ADD (Attention Deficit Disorder) or ADHD (Attention Deficit Hyperactivity Disorder) diagnosis. The latter variable was included because of the co-occurrence of LD and ADHD reported in the literature (Hallahan, Kauffman, & Lloyd, 1999; Smith, 1998). Additionally, some authors have found that college students with an LD only diagnosis perform differently than those with dual ADHD and LD diagnosis on self-report measures of organization (Hillman, 2004), as well as academic and cognitive measures (Sparks & Javorsky, 2005). Unlike the LD status of the participants, I could not independently confirm the ADHD diagnosis of the participants. However, because over half of the participants reported having an ADHD diagnosis, a secondary analysis was conducted to explore potential differences in the patterns between those reporting and

those not reporting an ADHD diagnosis. A more complete description of the sample and

distinction between the two groups is presented in Chapter 4.

   Integration measure. The integration measure was drawn directly from questions

on the *FYS* (Milem & Berger, 1997). The academic and social integration subscales

found on the *FYS* include a total of 18 items. There are 10 items assessing academic

integration and 10 items assessing social integration, with two items overlapping on the

subscales. The subscales were developed by Milem and Berger as a perceptual measure

of academic and social integration and were drawn directly from earlier instruments

(Pascarella & Terenzini, 1980) used to test Tinto's model. The scales are perceptual, in

which students are asked to indicate how much they agree with statements regarding their

own academic and social integration at the university (see Appendix E). For each

question possible responses include: (1) "Strongly Disagree"; (2) "Disagree"; (3)

"Agree"; and (4) "Strongly Agree". An item composition of the academic and social

integration subscales can be found in Appendix F.

   Academic and social integration have been measured using the *FYS* subscales or

adaptations of the subscales in a number of studies (Berger & Milem, 1999; Braxton,

Vesper, & Hossler, 1995; Braxton, Milem, & Sullivan, 2000; Milem & Berger, 1997).

The items present on the scales represent the constructs of social and academic

integration as outlined by Tinto and include questions regarding academic and social

engagement with peers and faculty, as well as perceptions of academic and social

development. Reliability data indicate an alpha = .74 for the academic integration

subscale and alpha = .72 for the social integration subscale (Berger & Milem, 1999). The

reliability coefficient for this study was .78 for the total integration scale, .64 for the

academic integration subscale, and .73 for the social integration subscale.

Although Milem and Berger do not report validity data, evidence of validity for

this instrument can be surmised. Construct validity is supported based on the

development of the scales. As previously stated, both the academic integration and social

integration items were developed directly from Pascarella & Terenzini's (1980) early

measure of these constructs (*Institutional Integration Scale*). Additionally, the items

present on the scale directly assess assertions found in Tinto's theory. For example, Tinto

argues that greater levels of informal faculty contact lead to increased social integration

at the university (Tinto, 1975; 1993). One of the items found on the social integration

subscale is "Since coming to the university I have developed a close, personal

relationship with at least one faculty member". As well, Tinto (1975) frames academic

integration to include an individual's intellectual development during college, including

ones' identification with the norms of the academic system. Items on the academic

integration subscale reflect this construct. An example of such an item is "My academic

experience at this university has had a strong positive influence on my intellectual growth

and interest in ideas".

Criterion related validity is also evident for these scales. One would expect that

students with high levels of social integration would be more involved with peers and

engaged in activities on campus. Milem and Berger (1997) found a significant, positive

relationships between level of social integration and involvement with peers (beta = .25)

and a significant, negative relationship between level of social integration and

nonengagement with the university (beta = -.33). The authors also found a significant,

negative relationship between level of academic integration and nonengagement with the university (beta = -.44). In each case, the measure of engagement in the university was a behavioral measure.

   SAT. The *SAT* is a standardized test of achievement intended to measure a student's readiness for college. The test is typically taken by high school juniors and seniors. *SAT* scores were chosen as one measure of past academic achievement because they are commonly used by colleges and universities in their admissions decisions and thought to represent a student's acquired skills in the area of language and math. Further, *SAT* scores have consistently been documented to correlate with college GPA (Beck & Davidson, 2001; Tross, et al., 2000; Wolfe & Johnson, 1995) and retention (Pascarella & Terenizi, 1980), and represent language skills taught in high school curriculum (Cohn & Cronbach, 1987).

   Over the past several years, the *SAT* has been redesigned, and the first group of students to take the new *SAT* did so in March 2005. The new *SAT* has three sections: *Writing, Critical Reading, and Math*. Participants in this study took the *SAT* prior to March 2005, thus their scores reflected the previous edition's subscales. The subscales of that version consist of *Verbal* and *Math*. Both subscales are scored on a 200 to 800 scale. The *SAT* is designed to have a mean and standard deviation 500 and 100, respectively, for each subscale. However, with each yearly administration, the mean and standard deviation vary slightly. The most recent data, reported on college bound seniors in 2005, revealed a mean of 508 and standard deviation of 113 for the *Verbal* section and a mean of 520 and standard deviation of 115 for the *Math* section (College Board, 2005).

ACT. The *ACT* is also a standardized test of achievement intended to measure a student's readiness for college. The test is typically taken by high school juniors and seniors. Although the *SAT* is the most commonly taken entrance exam by students at this university, twenty-seven percent (n=26) of the participants in this study took the *ACT*, rather than the *SAT*. The *ACT* has four sections: *English, Reading, Mathematics,* and *Science.* All subscales are scored on a 1 to 36 scale and the composite score is an average of the four subscale scores and is also presented on a 1 to 36 scale. The mean composite score for students entering college in the Fall of 2005 was a 20.9 (SD = 4.9). *ACT* scores were converted to an *SAT* scale in order to perform statistical analyses. The practice of converting *SAT* and *ACT* scores is widely accepted in higher education admissions (College Board, 1999; Dorans, 1999).

High school GPA. High school GPA was the second measure of past academic achievement used in this study. In addition to entrance exam scores, high school GPA is commonly used by colleges and universities in their admissions process. High school GPA was chosen as a measure of the construct of past academic achievement because a student's high school GPA is thought to reflect his or her ability to succeed in an academic setting. Further, high school GPA has consistently been shown to correlate with college GPA (House, 2002; Tross, et al., 2000; Wolfe & Johnson, 1995) and retention (Pascarella & Terenzini, 1980). For the purpose of this study, overall cumulative high school GPA was used as a predictor variable. This GPA is on a scale ranging from .0 to 4.0 and represents the average of all course grades from high school. High school GPA was treated as a continuous variable ranging from .0 to 4.0.

College GPA. College GPA was one of two criterion variables for this study. College GPA is generally viewed as a reflection of a student's academic success. Like high school GPA, college GPA at the participating university is on a scale ranging from .0 to 4.0 and represents the average of all course grades. For the purpose of this study college GPA reflected a student's cumulative GPA at the end of the spring semester of the student's first or second year of enrollment. College GPA was treated as a continuous variable ranging from .0 to 4.0.

Intent to persist. Intent to persist was the second criterion variable for this study. Intent to persist was measured with a composite score of three items, taken directly from the *FYS* (Milem & Berger, 1997). Participants completed this portion of the survey in March, along with the rest of the survey; they were asked of their intent to persist into the next academic year. The use of intent to persist as a proxy of persistence is well documented in the research literature (Bean, 1982; Braxton, et al., 1995; Cabrerra, et al., 1993; Milem & Beger, 1997). The intent to persist items were located at the end of the integration survey (Appendix E). Students were asked "Based on your judgment right now, what is the likelihood that you will enroll at this university next fall?" There were three consecutive opportunities to respond to this question. The first set of responses ranged from (1) "extremely unlikely" to "extremely likely". The second set of responses ranged from (1) "Certain Not to Re-enroll" to (5) "Certain to Re-enroll". The final set of responses ranged from (1) "No Chance" to (5) "100% Sure to Re-enroll". The use of three items, rather than a single item allowed for increased variability and calculation of reliability. The alpha estimate for this scale used in a previous study was .89 (Braxton, Milem, & Sullivan, 2000). For this study the alpha coefficient was .94.

Procedures

Two strategies were used to collect data after the participant pool was identified (described under *recruitment*). First, the demographic information and measures of integration and intent to persist were collected by survey directly from the students. High school GPA, entrance exam scores, and college GPA were collected through a review of records with the DRC.

One student attended an advertised session to complete the survey, all other participants stopped by my table set up in the L.S.C. courtyard on their way into or coming out of the L.S.C. building. Students were asked if they were freshmen or sophomores and upon an affirmative response they were asked if they would like to participate in a research study. In each case, participants were asked to complete the demographic questionnaire and the integration measure after: (a) it was explained that only freshmen and sophomores with an LD could participate; (b) the purpose of the study was explained; (c) they were informed that participation was not mandatory; and (d) they read and signed the informed consent (Appendix G). As determined by the Associate Registrar, they were also asked to provide separate written consent (Appendix H) for me to access their high school GPAs, entrance exam scores, and cumulative college GPA at the end of the spring semester. All participants filled out the survey in my presence; it took approximately 15 to 25 minutes for participants to complete the survey and consent forms. Each participant was given a *Chipolte* gift card worth $5 at the end of the session as a thank you for participating. In addition, each participant had the opportunity to complete a raffle entry form (Appendix I) and be entered into a drawing to win one of

three cash prizes in the amount of $100, $75, and $50. The drawing took place and prizes were awarded at the end of data collection in June.

After the initial 108 participants completed the surveys I met with the Assistant Director of the DRC to collect high school GPAs and entrance exam scores. At this point it was determined by the Assistant Director of the DRC that eleven of the individuals who filled out the survey were not registered with the DRC as students with an LD. The surveys for those eleven students were discarded and no additional information was gathered on these students. For the remaining 97 students, high school GPAs and *SAT* or *ACT* scores were collected. One month after the end of the spring semester, I returned to the DRC and obtained the cumulative college GPAs for each of the participants.

Design and Data Analysis

This study is a descriptive, non-experimental design to examine the relationship between past academic achievement and integration variables to the academic success and intent to persist for college freshmen and sophomores with LD. The research questions were: (1) Controlling for background characteristics, what are the relative contributions of past academic achievement, academic integration, and social integration to college GPA for college freshmen and sophomores with LD? (2) Controlling for background characteristics, what are the relative contributions of past academic achievement, academic integration, and social integration to intent to persist for college freshmen and sophomores with LD?

Questionnaires were scored by hand and all data was entered by me into a computer spread sheet using Excel, and analyzed using SPSS version 14 for Windows. I chose at random twenty of the surveys to be rescored and recalculated in order to check

for reliability of scoring. A total of three errors were found from a possible 500 errors, resulting in an error rate of .006. I also chose at random 20 of the surveys to check for data input errors. A total of 2 errors were found from a possible 2226 errors, resulting in an error rate of .001. Because these error rates are considered low, further checks were deemed unnecessary. In order to maintain confidentiality, once all data was collected and scored, the information for each student was coded by number and all names were removed.

Data analysis included descriptive statistics and intercorrelations of all variables. Further, independent t-tests and chi-square analyses were run to determine the existence of group differences between those who took the *ACT* versus the *SAT* and for those who reported having been diagnosed with ADHD versus those who did not.

Hierarchical multiple regression analysis was used to answer the research questions. For each analysis on college GPA and intent to persist, the predictor variables were entered in a stepwise fashion. In the first analysis the first block of variables entered was background characteristics (race, gender, SES-mother's level of education), followed by a block of past academic achievement (*SAT* composite and overall high school GPA), and finally a block of total integration**.** A second analysis was conducted in which block three was divided into two blocks, after block one (background characteristics) and block two (past academic achievement) were entered, academic integration was entered as the third block and social integration entered as the fourth block. In a third analysis social integration was entered as the third block and academic integration as the fourth block. These final two analyses were conducted to determine the proportion of unique variance

and significance of academic and social integration in predicting college GPA and intent to persist for college freshmen and sophomores with LD.

Because of the finding that the sample was comprised of over fifty percent (n = 52) of participants who reported having been diagnosed with ADHD, in addition to LD, secondary multiple regression analyses were conducted to investigate differences between the LD only and the dual diagnosis group in regard to patterns of predictors for college GPA and intent to persist. In these analyses, group status (LD only or dual diagnosis) was added as the first step in each of the six original multiple regression models to determine the amount of variance accounted for by diagnosis. Group status was then entered last in each of the six original multiple regression models in order to investigate if diagnosis accounted for any unique variance above and beyond that accounted for by background characteristics, past academic achievement, and levels of integration.

In the following chapter I present the descriptive statistics, intercorrelations among the variables, and results of each of the six multiple regression analyses for the entire sample. In addition, the secondary analyses, including the descriptive statistics for the LD only sub sample and dual diagnosis sub sample, intercorrelations among the variables for each group, the multiple regression analyses with group status as an independent, predictor variable, and tests of group difference between the LD only and dual diagnosis groups are presented.

Chapter IV

Results

In this Chapter I present the analyses conducted to assess the impact integration had on college GPA and intent to persist for college freshmen and sophomores with LD beyond their background characteristics and past academic achievement. The primary analyses of the full sample is presented first, followed by the secondary analyses, in which ADHD diagnosis is included as an independent variable.

Primary Analyses

The results presented in this section were based on the full sample ($n = 97$) and include descriptive statistics for the integration and intent to persist measures, the intercorrelations of measures and the hierarchical multiple regression analyses.

Descriptive Statistics

Integration measures. The integration measure included 18 items that were rated on a 4 point Likert scale. Possible total integration scores ranged from a low of 18, indicating minimal perceived integration to a high of 72, indicating a high level of perceived integration. Both social and academic integration subscales consisted of 10 items, 2 of the items were present on both scales. Social integration and academic integration scores ranged from a possible low of 10 to a possible high of 40. In each case the higher the score, the greater the perceived social or academic integration. For the sample in this study, total integration scores ranged from a low of 29 to a high of 68. The mean total integration score was a 52.6 (*SD*= 6.25). The mean social integration score and academic integration score were similar at 30 (*SD*= 4.30) and 29.38 (*SD*= 3.47), respectively. The skewness values for the distribution of scores for each of the three

measures were within one standard error of the mean, well within the normal range of +/-2.0 (Lomax, 2001). The kurtosis of the distribution of scores for the academic, social, and total integration measures were 1.322, 3.665, and 1.927 respectively. In each case a peaked distribution is present; however kurtosis is known to have minimal effects on regression estimates (Lomax, 2001). Thus, no efforts were made to address the kurtosis finding for the social integration distribution. Complete descriptive statistics for the integration measures are presented in Table 3.

Table 3

Descriptive Statistics for Integration and Persistence Measures

Variable	Mean	*SD*	Range	Skewness	Kurtosis
Integration Measures					
Total Integration	52.61	6.25	29.00-68.00	-.253	1.927
Academic Integration	29.38	3.47	18.00-39.00	.060	1.322
Social Integration	30.00	4.30	11.00-40.00	-.761	3.665
Persistence[1]	4.50	.91	2.00 - 5.00	-1.690	1.576

[1] This score in an average of the three intent to persist questions

Intent to persist measure. The persistence measure included three items on a five point Likert scale. Once averaged, possible persistence scores ranged from one to five. The higher score the score indicated a participant's self-report of a greater likeliness to persist at the present university the following fall semester. The mean persistence score was a 4.5 (*SD*= .91), indicating an overall high level of intended persistence among the participants. The distribution of scores for this measure indicated a leptokurtic and negatively skewed distribution, though both the kurtosis and the skewness of the

distribution of scores for this measure were within +/-2.0. Complete descriptive statistics for the integration measure are presented in Table 3.

Intercorrelations of Measures

A correlation analysis was conducted to determine the relationship between the background characteristics of the participants (i.e., race/ethnicity, gender, and SES), the participants' previous academic achievement (i.e., high school GPA and overall *SAT* score), integration variables (i.e., total integration score, academic integration score, and social integration score), and the college GPA and intent to persist of the participants. In addition, participants' ADHD status, age, year in school and housing arrangements were included in the correlation analyses to determine the presence of any relationship that required further investigation. Intercorrelations are presented in Table 4.

Significant correlations included positive relationships between total integration and academic integration ($r = .875$), total integration and social integration ($r = .888$), and academic integration and social integration ($r = .647$). Of the integration measures, only academic integration was significantly correlated with *SAT* scores ($r = -.214$). Additionally, intent to persist was significantly, positively correlated with total integration ($r = .458$), academic integration ($r = .399$), social integration ($r = .460$), and college GPA (.219) and significantly, negatively correlated with *SAT* scores ($r = -.314$). There was a significant correlation between college GPA and high school GPA ($r = .264$) and college GPA and being female ($r = .344$). A reported ADHD diagnosis was significantly, negatively correlated was high school GPA ($r = -.252$) and significantly, positively correlated with *SAT* scores ($r = .218$).

Table 4

Intercorrelations among Predictor and Criterion Variables

Variables	Gender	SES	H.S. GPA	SAT	Total Integ.	Academic Integ.	Social Integ.	College GPA	Intent to Persist	ADHD	Age	Year	Housing
Race/Ethnicity[1]	.035[7]	.217	.058	.062	.176	.181	.167	.059	-.029	.189[7]	-.082	.028[7]	.257*[7]
Gender[2]	---	.168	.195	-.118	-.011	-.014	.010	.344**	.060	-.061[7]	-.203*	-.174[7]	.201[7]
SES[3]	---	---	.218*	.051	.055	.056	.051	.153	-.028	.093[7]	-.084	.061[7]	.197[7]
H.S. GPA	---	---	---	-.164	.129	.121	.128	.264**	.150	-.252*	.170	.204*	.262[8]
SAT	---	---	---	---	-.191	-.214*	-.140	-.081	-.314**	.218*	-.167	-.013	.194[8]
Total Integ	---	---	---	---	---	.875**	.888**	.138	.458**	-.065	-.011	.173	.174[8]
Academic Integ	---	---	---	---	---	---	.647**	.192	.399**	.089	-.016	.177	.216[8]
Social Integ	---	---	---	---	---	---	---	.113	.460**	-.005	.000	.157	.105[8]
College GPA	---	---	---	---	---	---	---	---	.219*	-.067	-.017	.128	.059[8]
Intent to Persist	---	---	---	---	---	---	---	---	---	-.055	-.053	-.105	.174[8]
ADHD[4]	---	---	---	---	---	---	---	---	---	---	-.053	.004[7]	.031[7]
Age	---	---	---	---	---	---	---	---	---	---	---	.590**	.466[8]

Year[5]	---	---	---	---	---	---	---	---	---	---	---	---	.682**[7]

[1]0 =Minority, 1 = White; [2] 0 = Male, 1 = Female; [3] Mother's Education: 3 = High School Degree or less, 4 = Some College, 5 = College Degree, 6 = Some

Graduate School, 7 = Graduate Degree; [4] 0 = No ADHD, 1 = Diagnosed with ADHD; [5] 0 = Freshman, 1 = Sophomore; [6] 0 = On campus, 1 = With parents, 2 =

Off campus; [7] Phi correlation; [8] Eta correlation

* p < .05 ** p < .01

Multiple Regression Analyses

  College GPA as criterion. Three hierarchical multiple regression analyses were conducted with GPA as the criterion variable. For each of the three analyses the first block entered into the regression equation was background characteristics, comprising gender, race, and SES. The second block entered was past academic achievement, characterized by composite *SAT* scores and overall high school GPA. The third block entered varied. In the first analysis it was total integration score. In the second analysis social integration score was entered in the third block and academic integration entered in the fourth block. In the final analysis, academic integration was entered in the third block and social integration was entered in the fourth block. Regression results for college GPA are presented in Table 5.

  In the first analysis, the first block of background characteristics accounted for all of the unique significant variance $F(3, 93) = 4.662$; $R^2 = .13$, $p < .01$; past academic achievement and total integration did not account for any significant variance in college GPA above and beyond that accounted for by background characteristics. The full model, with total integration, accounted for 18 percent (adjusted $R^2 = .12$) of the variance in college GPA $F(6, 90) = 3.203$, $p < .01$.

  In the second analysis with academic integration entered last and in the third analysis with social integration entered last, background characteristic continued to account for all of the significant variance in college GPA. In each case, the full models accounted for 19 percent (adjusted $R^2 = .13$) of the variance in college GPA $F(7, 89) = 3.045$, $p < .01$.

Table 5

Hierarchical Multiple Regression Analysis on College GPA

Variables	*B*	*SE B*	*β*	*t*	R^2
Total Integration on College GPA					
Step 1					.13**
Gender	.378	.125	.30**	3.027**	
Race	.041	.192	.02	.212	
SES	.029	.048	.06	.593	
Step 2					.16**
SAT	.003E-03	.000	.00	.008	
H.S. GPA	.266	.153	.18	1.745	
Step 3					.18**
Total Integration	.011	.010	.11	1.120	
Academic Integration / Social Integration on College GPA					
Step 1					.13**
Gender	.384	.124	.31**	3.096**	
Race	.020	.192	.01	.103	
SES	.026	.048	.05	.544	
Step 2					.16**
SAT	.007E-02	.000	.02	.179	
H.S. GPA	.265	.152	.18	1.745	

Step 3					.17**
Social Integration	-.007	.018	-.05	-.374	
Step 4					.19**
Academic Integration	.037	.023	.20	1.598	
Step 3					.19**
Academic Integration	.037	.023	.20	1.598	
Step 4					.19**
Social Integration	-.007	.018	-.05	-.374	

*p < .05 **p < .01

Intent to persist as criterion. Three hierarchical multiple regression analyses were conducted with intent to persist as the criterion variable. For each of the three analyses the first block entered into the regression equation was background characteristics, comprised of gender, race, and SES. The second block entered was past academic achievement, represented by composite *SAT* scores and overall high school GPA. The third block entered varied. In the first analysis it was total integration score. In the second analysis social integration score was entered in the third block and then academic integration entered in the fourth block. In the final analysis, academic integration was entered in the third block and social integration was entered in the fourth block. Regression results for college GPA are presented in Table 6.

In the first analysis, it was found that the block of background characteristics was not significant, accounting for just one percent of the variance in intent to persist $F(3, 93)$ = .194. While past academic achievement accounted for an additional, significant 10 percent of the variance beyond background characteristics $F\Delta(2, 91) = 5.326, p < .01$, the model including only background characteristics and past academic achievement was not significant $F(5, 91) = .055$. Total integration accounted for a significant 17 percent of the variance above and beyond that accounted for by background characteristics and past academic achievement $F\Delta(1, 90) = 21.274, p < .01$. Thus, the full model accounted for a significant 28 percent (adjusted $R^2 = .23$) of the variance in intent to persist $F(6, 90) = 5.846, p < .01$.

Table 6

Hierarchical Multiple Regression Analysis on Intent to Persist

Variables	*B*	*SE B*	*β*	*t*	R^2
Total Integration on Intent to Persist					
Step 1					.01
Gender	.077	.170	.42	.451	
Race	-.289	.262	-.10	-1.105	
SES	-.049	.066	-.07	-.740	
Step 2					.11
SAT	-.001	.001	-.21*	-2.188*	
H.S. GPA	.161	.208	.07	.775	
Step 3					.28**
Total Integration	.063	.014	.43**	4.612**	
Academic Integration / Social Integration on Intent to Persist					
Step 1					.01
Gender	.077	.169	.04	.398	
Race	-.312	.260	-.11	-1.198	
SES	-.049	.065	-.07	-.751	
Step 2					.11
SAT	-.001	.001	-.21*	-2.223*	

H.S. GPA	.149	.207	.07	.722
Step 3				.29**
Social Integration	.074	.025	.35**	2.997**
Step 4				.30**
Academic Integration	.038	.031	.14	1.213
Step 3				.23**
Academic Integration	.038	.031	.14	1.213
Step 4				.30**
Social Integration	.074	.025	.35**	2.997**

*p < .05 **p < .01

In the second analysis, with social integration entered third, and academic integration entered last, social integration accounted for a significant 18 percent of the variance in intent to persist, above and beyond that accounted for by background characteristics and past academic achievement $F\Delta(1, 90) = 22.756, p <.01$. Academic integration did not significantly add to the model. The full model accounted for 30 percent (adjusted $R^2 = .25$) of the variance in intent to persist $F(7, 89) = 5.486, p <.01$.

In the final analysis, with social integration entered last, academic integration accounted for a significant 12 percent of the variance in intent to persist, beyond that accounted for by background characteristics and past academic achievement $F\Delta(1, 90) = 14.114, p <.01$. Social integration added an additional, significant 7 percent to the total variance in intent to persist $F\Delta(1, 89) = 8.981, p <.01$. Because of the shared variance of academic and social integration, upon entry of social integration into the model, academic integration was no longer independently significant. Like the full model, with academic integration as the final step, this model with social integration as the final step accounted for 30 percent (adjusted $R^2 = .25$) of the total variance in intent to persist.

Secondary Analyses

The results presented in this section include self-reported ADHD diagnosis as an independent variable in the regression equations. These analyses include descriptive statistics and intercorrelations of the measures by group (LD only diagnosis or dual diagnosis of LD and ADHD), and multiple regression analyses with ADHD diagnosis as a predictor variable.

Descriptive Statistics

In this section the descriptive statistics of the integration and persistence measures are presented for the group of students with an LD only diagnosis ($n = 45$) and the group with a dual diagnosis of LD and ADHD ($n = 52$).

Integration measures. Complete descriptive statistics for the integration measures are presented in Table 7. Although the range of scores for the LD only sample was more restricted than that of the sample reporting a dual diagnosis of LD and ADHD, there were no significant differences between the groups' mean scores on the total integration scale, or either of the subscales. For the LD only sample, skewness and kurtosis values for the distribution of scores for each of the three measures were within 1.0 standard error of the mean. While the distribution was negatively skewed for each measure of integration for the dual diagnosis sample, the statistics for all three were also within the acceptable range of -2.0 to +2.0. However, each of the distributions for the dual diagnosis group was extremely leptokurtic, resulting in restricted variability of scores.

Intent to persist measure. The means of the intent to persist scores were similar for the two groups. In both cases, the scores indicate an overall high level of intended persistence among the participants. The distribution of scores for this measure indicated a leptokurtic and negatively skewed distribution for both groups, though the kurtosis and the skewness for the distribution of scores for this measure were within the acceptable range of -2.0 to +2.0. Descriptive statistics for the intent to persist measure are presented in Table 7.

Table 7

Descriptive Statistics for Integration and Persistence Measures by Diagnosis Group

Variable	Mean	SD	Range	Skewness	Kurtosis
LD only Diagnosis Group					
Integration Measures					
Total Integration	53.04	6.19	40.00-66.00	.269	-.024
Academic Integration	29.71	3.29	24.00-37.00	.630	-.095
Social Integration	30.02	4.07	20.00-40.00	-.078	.810
Intent to Persist[1]	4.55	.86	2.00 - 5.00	-1.936	2.726
LD / ADHD Dual Diagnosis Group					
Integration Measures					
Total Integration	52.23	6.34	29.00-68.00	-.670	3.516
Academic Integration	29.10	3.63	18.00-39.00	-.254	2.058
Social Integration	30.00	4.52	11.00-40.00	1.20	5.512
Intent to Persist[1]	4.45	.95	2.00 - 5.00	-1.552	1.047

[1]This score in an average of the three intent to persist questions.

Intercorrelations of Measures

Correlation analyses were conducted to determine the relationship between the background characteristics of the participants (i.e., gender, race/ethnicity, and SES), the participants previous academic achievement (i.e., high school GPA and *SAT*), integration variables (i.e., total integration score, academic integration score, and social integration score), and the college GPA and intent to persist of the participants by group status (LD only diagnosis vs. dual LD / ADHD diagnosis). Intercorrelations are presented in Table 8.

The pattern of correlations for the subgroups was similar to that of the total sample. For the total sample and both subgroups integration measures were positively correlated with each other and were positively correlated with intent to persist, but not with college GPA. For the LD only diagnosis group significant correlations include significant positive relationships between total integration and academic integration ($r =$ .862), total integration and social integration ($r =$ .905), and academic integration and social integration ($r =$ .638). Academic integration was also significantly correlated with high school GPA ($r =$ .445). While none of the integration measures were significantly correlated with college GPA for this group, total integration and social integration were both significantly correlated with intent to persist ($r =$ .420) and ($r =$ .482), respectively.

There was a similar pattern of correlations among persistence measures for the dual diagnosis group. Total integration and academic integration were significantly correlated ($r =$ .884), as were total integration and social integration ($r =$ .879) and academic integration and social integration ($r =$ .658). Social integration was also significantly correlated with being white ($r =$ .275) and college GPA was positively correlated with being female ($r =$ .379). Intent to persist was significantly, negatively

Table 8

Intercorrelations among Predictor and Criterion Variables by ADHD Diagnosis Status

LD only correlations are in the upper triangular matrix, dual diagnosis correlations in the lower matrix

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Race/ Ethnicity[1]	---	.065[6]	.040	.118	.053	.155	.209	.104	.094	-.107	-.090	-.095[6]	.505**[6]
2. Gender[2]	.026[6]	---	.286	.079	-.265	.191	.162	.173	.300*	.012	-.196	-.183[6]	.093[6]
3. SES[3]	-.152	.065	---	.127	.076	.107	.059	.070	.180	.052	-.288	.173[6]	.486[6]
4. H.S. GPA	.106	.290*	.283	---	-.082	.121	.084	.142	.445**	.113	.219	.225	.144[7]
5. SAT	-.016	.016	.060	-.145	---	-.251	-.251	-.254	.256	-.186	-.083	-.105	.269[7]
6. Total Integration	.259	-.193	.006	.113	-.129	---	.862**	.905**	.028	.420**	-.224	.113	.186[7]
7. Academic Integration	.213	-.164	.045	.119	-.164	.884**	---	.638**	.043	.286	-.175	.128	.242[7]
8. Social Integration	.275*	-.120	.037	.123	-.065	.879**	.658**	---	-.019	.482**	-.142	.153	.124[7]
9. College GPA	.069	.379**	.138	.158	-.227	.196	.262	.179	---	.010	-.050	-.011	.118[7]
10. Intent to Persist	.093	.093	-.092	.166	-.397**	.484**	.475**	.445**	.322*	---	-.018	-.035	.112[7]

11. Age	-.057	-.217	.262	.114	-.213	.148	.090	.101	-.006	-.083	---	.520**	.338*[7]
12. Year[4]	.204[6]	-.167[6]	.089[6]	.200	.056	.226	.218	.161	.209	-.159	.649*	---	.600**[6]
13. Housing	.165[6]	.312[6]	.262[6]	.398*[7]	.269[7]	.194[7]	.214[7]	.154[7]	.165[7]	.232[7]	.578**[7]	.165[6]	

[1] 0 =Minority, 1 = White; [2] 0 = Male, 1 = Female; [3]Mother's Educ: 3 = H.S. Degree or less, 4 = Some College, 5 = College Degree, 6 = Some Graduate School, 7 = Graduate Degree; [4] 0 = Freshman, 1 = Sophomore; [5] 0 = On campus, 1 = With parents, 2 = Off campus; [6]Phi correlation; [7]Eta correlation.

*p < .05 ** p < .01

correlated with *SAT* scores ($r = -.397$), while it was significantly, positively correlated

with total integration ($r = .484$), academic integration ($r = .475$), social integration ($r =$

.445), and college GPA ($r = .322$).

Multiple Regression Analyses

   College GPA as criterion. In order to assess the contribution of ADHD diagnosis

relative to the other predictor variables on college GPA two sets of hierarchical multiple

regression analyses were conducted. In the first set, to determine the amount of variance

in college GPA disability diagnosis accounted, ADHD status was entered as the first

block in the equation. The second and third blocks were background characteristics and

past academic achievement, respectively. In the first analysis in this set total integration

was the final block. Academic and social integration were alternately block three and four

in the two subsequent analyses. In the second set of analyses, ADHD status was entered

last in each of the equations to assess the amount, if any, unique variance disability status

accounted for above and beyond the other predictor variables. Results from the regression

analyses are presented in Table 9.

   By itself, ADHD diagnosis accounted for less than one percent of the variance in

college GPA. When ADHD status was added last into the model using total integration as

the final integration predictor variable, the full model continued to account for eighteen

percent of the variance in college GPA (adjusted $R^2 = .11$), with ADHD status not adding

significantly to the model. ADHD status also failed to add anything to the models

containing academic integration or social integration as the final integration predictor

variables.

Table 9

Hierarchical Multiple Regression Analysis on College GPA, with ADHD as a Criterion

Variable	*B*	*SE B*	*β*	*t*	R^2
Total Integration on College GPA					
Step 1					.01
ADHD	.004	.013	.00	.028	
Step 2					.13*
Gender	.378	.125	.30**	3.011**	
Race	.040	.197	.02	.201	
SES	.029	.049	.06	.590	
Step 3					.16*
SAT	.003-03	.000	.00	.003	
H.S. GPA	.267	.153	.18	1.696	
Step 4					.18*
Total Integration	.011	.010	.11	1.114	
Academic Integration / Social Integration on College GPA					
Step 1					.01
ADHD	.002	.128	.00	.127	
Step 2					.13*
Gender	.385	.125	.31**	3.080**	
Race	.015	.197	.01	.074	

SES	.003	.048	.05	.541	
Step 3					.16*
SAT	.006E-02	.000	.02	.156	
H.S. GPA	.270	.157	.18	1.718	
Step 4					.17*
Social Integration	-.007	.018	-.05	-.381	
Step 5					.19*
Academic Integration	.037	.023	.21	1.594	
Step 4					.19*
Academic Integration	.037	.023	.21	1.594	
Step 5					.19*
Social Integration	-.007	.018	-.05	-.381	

*p < .05 **p < .01

Intent to persist as criterion. In order to assess the contribution of ADHD diagnosis relative to the other predictor variables on intent to persist, two sets of hierarchical multiple regression analyses were conducted. As in the analyses conducted with college GPA as the criterion variable, in the first set ADHD status was entered as the first block in the equation and in the second set of analyses, ADHD status was entered last in each of the equations. Results from the regression analyses are presented in Table 10.

When entered first into the model, ADHD accounted for less than one percent of the variance in intent to persist. The amount of variance accounted for by the full model with total integration as a predictor variable remained 28 percent (adjusted $R^2 = .23$). When ADHD status was added last into the model using total integration as the final integration predictor variable, the full model continued to account for 28 percent of the variance in intent to persist, with ADHD status not adding significantly to the model. ADHD status also failed to add anything to the models containing academic or social integration as the final integration predictor variables.

Table 10

Hierarchical Multiple Regression Analysis on Intent to Persist, with ADHD as a criterion

Variables	*B*	*SE B*	*β*	*t*	R^2
Total Integration on Intent to Persist					
Step 1					.00
ADHD	.112	.175	.06	.643	
Step 2					.01
Gender	.077	.171	.04	.451	
Race	-.324	.268	-.11	-1.209	
SES	-.048	.066	-.07	-.732	
Step 3					.11
SAT	-.001	.001	-.22*	-2.257*	
H.S. GPA	.193	.215	.09	.898	
Step 4					.28**
Total Integration	.063	.014	.43**	4.620**	
Academic Integration / Social Integration on Intent to Persist					
Step 1					.00
ADHD	.086	.174	.05	.492	
Step 2					.01
Gender	.068	.169	.04	.399	

Race	-.339	.267	-.12	-1.268	
SES	-.049	.066	-.07	-.744	
Step 3					.11
SAT	-.001	.001	-.22*	-2.273*	
H.S. GPA	.173	.213	.08	.813	
Step 4					.29**
Social Integration	.073	.025	.35**	2.937**	
Step 5					.30**
Academic Integration	.040	.031	.15	1.251	
Step 4					.24**
Academic Integration	.040	.031	.15	1.251	
Step 5					.30**
Social Integration	.073	.025	.35**	2.937**	

*p < .05 **p < .01

Chapter V

Discussion

The primary purpose of this study was to assess the unique contribution of total

integration, academic integration, and social integration above and beyond background

characteristics (i.e., gender, race, SES) and past academic achievement (i.e., high school

GPA and *SAT* scores) to overall GPA and intent to persist of college freshmen and

sophomores with LD. This study may be the first to apply integration as a factor in a

model of academic success and persistence for college students with LD. Because over

half of the sample reported being diagnosed with ADHD, secondary analyses were

conducted to determine the contribution of ADHD diagnosis to GPA and intent to persist

for this sample. First, this section discusses the results obtained from the primary

analyses. Next, findings from the secondary analyses including ADHD diagnosis as a

predictor variable are discussed. Third, limitations of this study are addressed. Finally,

implications for future research and practice are discussed.

Primary Analyses

   College GPA as the criterion. Findings from the present study are consistent with

previous research which has demonstrated a positive correlation between high school

GPA and college GPA with unselected samples (Bean & Kuh, 1984; Beck & Davidson,

2001; Tross, et al., 2000; & Wolfe & Johnson, 1995). However, in the current study high

school GPA was more weakly correlated with college GPA than in much of the previous

literature. Whereas the correlation in this study was found to be $r = .26$, past research has

shown stronger correlations between the two variables; such as $r = .37$ (Beck &

Davidson); $r = .40$ (Wolfe & Johnson); and $r = .50$ (Tross, et al.). The lower correlation

found in this study may be attributed to the sample. In the previous studies the authors used unselected samples, whereas in the current study, the sample was selected based on disability status, resulting in a restricted range of scores for GPA. Additionally, unlike the findings reported in the previous studies which indicate that high school GPA is also independently and directly a significant predictor of college GPA, the results from the hierarchical multiple regression analyses in this study do not support this hypothesis. Rather, as indicated in Table 5, gender was the only independently significant variable in the current models assessing background characteristics, past academic achievement variables and total, academic, and social integration on college GPA.

Another unique finding in this study is that *SAT* score was neither correlated with high school GPA (see Table 4), nor was it individually a significant predictor of college GPA (see Table 6). Previous research with unselected samples has consistently documented the positive relationship between high school GPA and entrance exam scores (Beck & Davidson; Kahn & Nauta, 2001; Tross, et al.; Wolfe & Johnson). As well, *SAT* score typically present as a significant predictor of college GPA (Beck & Davidson; Tross, et al.; Wolfe & Johson). The unique findings that high school GPA and *SAT* scores were not significantly correlated and that neither was individually, nor collectively above and beyond background characteristics, a significant predictor of college GPA may be a reflection of the sample being studied. Students with LD struggle academically and often enter college with weaker past academic achievement scores (Vogel & Adelman, 1990; 1992). The finding that high school GPA and *SAT* scores did not predict college GPA for college students with LD is consistent with previous research showing that the construct of past academic achievement, measured by traditional indicators such as GPA and

achievement scores, is not a valid predictor of the academic success of students with LD in the college setting (Murray & Wren, 2003; Vogel & Adelman, 1993).

The regression model assessing total integration as a predictor of college GPA accounted for 18 percent of the variance in college GPA, total integration added a non-significant one percent to the model above and beyond background characteristics and past academic achievement. The two models assessing the unique contribution of academic and social integration both accounted for a total nineteen percent of the variance in college GPA. While academic integration accounted for a unique, though non-significant, two percent variance in college GPA, social integration did not add even one percent to the model.

These findings are noteworthy on both a theoretical and practical level. As previously discussed in Chapters I and II, Tinto's model is meant to explain student departure. The premise of his theory is that the greater an individual's academic and social integration, the greater likelihood he or she will persist. In his theory, academic performance is part of academic integration. However, in the present study I hypothesized that integration may actually be useful for explaining academic performance. Previous researchers have found support for the effects of integration or components of integration on college GPA (Bean & Kuh, 1984; Boulter, 2002; House, 2002). As evidenced by the results of the regression analysis showing that none of the integration variables added significant unique variance to the models predicting college GPA, this hypothesis was not supported in the present study. For the current sample of college freshmen and sophomores with LD, level of integration did not account for any unique variance in GPA. As theorized by Tinto, the current findings for students with LD

suggest that college GPA was more likely a component of academic integration, rather than predicted by integration.

Intent to persist as the criterion. A different pattern of results existed for the relationships between integration and intent to persist. Unlike college GPA, which was not significantly correlated with any of the integration variables, intent to persist was significantly correlated with all three integration variables. These findings are consistent with previous research examining the relationship between integration and persistence for unselected samples (Braxton, Vesper, & Hossler, 1995; Cabrerra, Nora, & Castaneda, 1993; Milem & Berger, 1997; Pascarella & Terenzini, 1980; Strauss & Volkwein, 2004). Unexpectedly, whereas background characteristics accounted for a significant amount of the variance in college GPA, background characteristics, as a block, were not significant predictors of intent to persist.

Another noteworthy finding was the statistically significant, negative correlation between *SAT* scores and intent to persist. This finding was not consistent with past research with unselected samples and may reflect the unique nature of this sample. It has been documented that individuals with LD often perform poorly relative to their peers on college entrance exams (Vogel & Adelman, 1990; 1992). Because participants were not asked what types, if any, accommodations they were eligible for or used while taking the *SAT* or *ACT*, no conclusions can be drawn for this sample about the interaction of LD, accommodations, and *SAT* scores. In sum, the models predicting intent to persist were only significant once the integration variables were added to background characteristics and past academic achievement. Thus, the finding that the negatively correlated *SAT* scores and level of total, academic, and social integration were the only independently

significant variables in these models supports the proposition that integration may be more important than background characteristics and past academic achievement for predicting persistence of college students with LD.

In addition to the statistical significance of these findings, the results have practical significance. Over half of the explained variance in this model was accounted for by integration variables. That is, while the full model with total integration accounted for twenty-eight percent of the variance in intent to persist, total integration, alone, accounted for a unique seventeen percent of the total variance. Likewise, whereas the full models containing academic and social integration as individual predictors accounted for thirty percent of the variance; academic and social integration combined accounted for nineteen percent of the variance beyond background characteristics and past academic achievement. These findings reveal that for students with LD being integrated into the university may trump traditional indicators of persistence such as GPA and *SAT* scores. This is consistent with the findings of Pascarella and Terrenzini (1980) in which scores from the *Institutional Integration Scale (ISS)* accounted for 21% of the unique variance in withdrawal from school in a model containing background characteristics and past academic achievement of students from an unselected sample.

College personnel should consider the impact integration into campus life may have for students with LD. The findings from this study suggest that becoming academically and socially integrated into the university, through connections with faculty and students, might serve to strengthen a student's commitment to persist at the university. As colleges and universities seek to increase persistence for this population and develop programs for that purpose, areas to think about include ways to promote the

integration of students with LD. Faculty-student mentoring programs, freshman year seminar classes, cohorts, and learning communities are examples of programs that may hold promise for promoting integration.

The finding that background characteristics and past academic achievement were not significant in the regression equation are inconsistent with Tinto's theory in which he argues that in addition to integration, individual attributes including background characteristics and past academic achievement do have effects on persistence. Researchers have consistently documented the effects of background characteristics and past achievement on persistence and intent to persist (Bean, 1980; Cabrera, et al., 1992; Kahn & Nauta, Pascarella & Terenzini, 1980; Strauss & Volkwein, 2004). A plausible explanation for the null findings regarding the effects of background characteristics and past academic achievement in this study may be the nature of the sample. Like Milem & Berger's (1997) sample from a highly selective university, in which they failed to find significant effects for background characteristics and past academic achievement, the current sample is also unique. Participants were mostly white (89%), with highly educated mothers (79% college degree or higher), suggesting restricted variability for these variables. Further, as students with LD who have typically struggled in school and receive current academic assistance and accommodations, past academic achievement variables may be less representative than more current cognitive and behavioral variables of student ability and achievement in the present setting. Finally, as discussed earlier, researchers in the area of LD have documented that students with LD typically have weaker pre-college academic achievement scores and that these scores are not good

predictors of college GPA. The findings in the present study additionally suggest that pre-college achievement factors are not good predictors of persistence for students with LD.

As expected, integration variables were consistently significant predictors of intent to persist. Interestingly, when examined as separate blocks, academic integration accounted for a significant amount of variance above and beyond background characteristics and past academic achievement ($\Delta R^2 = .12$), but did not add significantly above and beyond social integration ($\Delta R^2 = .01$). Conversely, social integration was significant above and beyond background characteristics and past academic achievement ($\Delta R^2 = .18$), as well as above and beyond academic integration ($\Delta R^2 = .07$). These findings indicate that while academic integration is important for predicting persistence of college students with LD, social integration may be most powerful. The results of this study parallel past research demonstrating that social integration trumps academic integration in its effect on institutional commitment, intent to return, and persistence (Braxton, Vesper, & Hossler, 1995; Milem & Berger, 1997; Berger & Milem, 1999; Strauss & Volkwein, 2004) and extends the findings to a different population. It is important to note that other researchers have reported opposite results with unselected samples, finding that academic integration has greater effects than social integration on institutional commitment, intent to return and persistence (Braxton & Brier, 1989; Cabrera, Nora, & Castaneda, 1993; Pascarella & Terenzini, 1983). It may be that because students with LD have greater difficulty with the academic arena of college than do students without LD, persisters with LD compensate by relying more on their social support systems.

In sum, integration was a significant predictor of intent to persist for this sample of college students with LD. However, integration factors do not have the same impact on college GPA for this sample as reported for other types of college students. While the total R^2 for the models predicting college GPA did not exceed .19, the models predicting intent to persist accounted for between 28 and 30 percent of the variance, akin to what most full models in previous research have been able to explain.

Secondary Analyses

Although some differences existed between the sub-sample of the students reporting a diagnosis of ADHD and those reporting no ADHD diagnosis, ADHD diagnosis did not have a significant impact on college GPA or persistence. When looked at as separate groups, gender and high school GPA were significantly correlated with college GPA for the LD only group. For the group of participants reporting a dual diagnosis, only gender was significantly correlated with college GPA. The hierarchical multiple regression analyses with ADHD as a predictor variable entered first revealed that ADHD accounted for a non significant one percent of the variance in college GPA. These findings indicate that the effects of having an additional diagnosis of ADHD do not impact college GPA for students with LD.

The patterns of correlations changed when intent to persist was the criterion variable. For the sample of LD only, total integration and social integration were significantly correlated with intent to persist. For the group with a dual diagnosis, total, academic, and social integration, in addition to *SAT* scores and college GPA were significantly correlated with intent to persist. However, when ADHD diagnosis was

entered first into the regression equation, it did not account for any variance in intent to persist.

These results add to a small body of literature examining the differences between college students with LD and those with a dual diagnosis of LD and ADHD. While some authors have found differences between the groups in organization (Hillman, 2004) and cognitive and achievement measures (Sparks & Javorsky, 2005), the findings from the present study indicate that ADHD diagnosis is not a relevant predictor for college GPA or intent to persist for students with LD.

Limitations

This study has several limitations. Many of the limitations are a result of the setting and sample. First, students with LD in this study self-identified to the university's Disability Resource Center. Additionally, all but one of the participants in this sample participated in a fee for services program on campus. Thus, the participants in this study represented a population of college students with LD who, based on their self-identification and use of extended campus resources, likely were more motivated and possessed a higher level of self-advocacy and/or have parents or others more actively involved in their acquisition of academic assistance than students with LD who were not registered with the DRC. It may be that those not registered did not know about the availability of free and appropriate accommodations, or they may have been aware of services, but believed they would not benefit from the use of such accommodations. This aspect of the sample limits generalizability to broader samples of young adults with LD.

A second limitation regarding the sample is the number of participants. In total, 97 students participated in this study. More participants would have yielded more power

and a greater ability to detect incremental change in the R^2 as variables were added to the models. Finally, the sample itself was very distinct; the participants were mostly white students, with highly educated mothers, all attending a four year, public institution in the southwestern United States. The uniqueness of this sample should be kept in mind while reviewing the results, as the generalizability of the findings is limited.

Another potential limitation to this study is in the self-report nature of much of the data. All demographic information, including the diagnosis of ADHD, was self-report. As the researcher, I can only assume that the information the participants provided was accurate. Further, the wording of the integration and persistence questions seemed to pose some problems for some of the participants. On the integration surveys, four of the questions were worded in the negative, using "not". On several occasions students stopped during the administration of the survey to ask for clarification. The use of reverse wording, though a good tool for helping to assess the reliability of an instrument, may create a unique problem for samples such as this one where many of the participants presumably struggle with reading and may have difficulty processing such a wording change. Although some participants stopped to ask for clarification about wording, it may be that others did not understand some of the items and possibly answered opposite of their true beliefs.

Some of the students also asked for clarification on the intent to persist questions that suggested they did not grasp the subtle differences in the language change between the three questions and had confusion about answering the same question three times. The three questions represented a graded response format, the first ranging from "likely" to "not likely", the second from "certain" to "not certain" and the third from "100% sure"

to "no chance". The three items have a high amount of shared variance, questions 1 and 2 $r = .79$, 1 and 3 $r = .78$, and 2 and 3 $r = .94$, which may suggest that students did not make the fine discrimination between the items. One must consider the participants who may not have caught the difference in the questions, resulting in a high reliability coefficient for the three questions, but possibly not a true representation of individual's intent to persist.

Finally, the differences between the participants who took the ACT and those who took the SAT present a limitation for interpretation of the results. A series of t-tests and chi-square analyses revealed that more minority students took the *ACT*, more freshmen were in the *ACT* group and that once converted to *SAT* scores, the *ACT* group had significantly lower scores than the *SAT* group. Future researchers should test and control for potential differences between groups.

Implications for research and practice

Given the findings and limitations of the current study, there are a number of potential directions for future research. First, future studies should aim to increase the sample size and recruit participants from a variety of colleges and universities, representing institutions of varied sizes, type, and geographic location. This would allow for greater generalizability of the findings. Additionally, researchers should seek to identify why social integration is more important than academic integration for intent to persist for college freshmen and sophomores with LD. An interesting question to be answered regarding a sample such as this one, in which the students had access to services beyond "reasonable accommodations", is how involvement in such a program promotes or inhibits academic and social integration. That is, are students in such a

program more integrated as a result of the services they receive and their contact with

support staff and other students with LD, or conversely, are they less integrated because

they are insulated and do not need to make as much contact with faculty and outside

peers in a setting away from where they receive services?

Extensions of this study should also include additional constructs in the model

that may more fully explain persistence and college GPA for students with LD. A

promising thirty percent of the variance in intent to persist was explained by background

characteristics, past academic achievement, and integration; leaving seventy percent of

the variance still unaccounted for. Constructs that are relevant to the daily lives of

individuals with disabilities, such as self-advocacy, self-determination, and self-

awareness should be considered for inclusion in future models.

The secondary finding in this study that a significant difference in scores existed

between those who took the *SAT* and those who took the *ACT* suggest that future

researchers may want to explore how these two tests differ and what the repercussions are

for tests takers, particularly students with LD.

The lack of significant findings regarding the impact of integration or past

academic achievement variables on college GPA also gives way to interesting questions

regarding what factors do impact the academic success of college students with LD.

Researchers should continue to study factors that might predict academic success of

college students with LD. As this study and others have failed to find a link between high

school achievement variables and college GPA, future research should look at factors that

may be more salient for students with LD; such as transition planning, high school IEP

goals, self-advocacy, and behaviors during college. Because of the infancy of research

focusing on college students with LD, multitudes of variables have yet to be explored. However, it is vital that research in this area integrate variables from multiple domains (e.g. behavioral, cognitive, academic, affective, social), rather than study any one domain in isolation.

The findings from this study suggest questions that may be best answered through qualitative research. For example, exploring the ways in which students with LD understand social and academic integration and its impact on academic success and persistence is key to better understanding the role integration plays for this population of students. Likewise, we need to more fully understand students' perceptions and beliefs about services they receive (e.g. priority registration, academic accommodations, tutoring) and how access to these services relate to their integration on campus. Finally, researchers should explore how students with LD become socially integrated in college and identify key aspects of this integration, including how having an LD impacts opportunities for social integration on campuses.

In this study an attempt was made to begin to delve into how a diagnosis of ADHD, in addition to an LD diagnosis might impact college GPA and intent to persist. Although no significant findings were present in this study for ADHD, sample size and the self-report nature of the ADHD diagnosis limit the interpretation of these results. The growing numbers of individuals with ADHD attending college requires the research community to study unique predictors of academic success and intent to persist for this population so that this group of students may be better served in the post-secondary education setting.

With the advent of Section 504 of the Rehabilitation Act and the Americans with Disabilities Act in the late part of the last century programs for students with disabilities, including those with LD, have increased on college campuses throughout the country. In addition to the guarantee of appropriate accommodations, many colleges and universities offer additional services to students with LD. Although the types, quantity, and quality of services vary, typical services are academic in nature and include tutoring, use of computer labs and special computer equipment, academic mentoring, programs to promote time management, study skills, and advocacy. Based on findings in the present study colleges may want to explore the role social integration plays in the academic persistence and success of students with LD. Programs in which students can connect with other students, staff and faculty in meaningful ways may promote the social integration of students, and thus increase a student's likeliness to persist.

There are also implications from this study for high school personnel, parents, and students with LD. IDEA (2004) requires the development of appropriate, measurable post-secondary goals. Those involved in transition planning for college bound individuals with LD should consider the ways in which a student's ability to become academically and socially integrated at college will impact the achievement of their goals. Thus, school personnel might consider curriculum which promotes self-advocacy, self-determination, and skills which empower students to connect with peers and faculty. Preparing students to interact with faculty within and outside of the classroom setting may serve to prepare students for college much in the same way preparing students academically does.

 In addition to the efforts made to academically prepare students with LD for college, the results of this study indicate that students should be prepared to make

important social connections with peers, as well. Often the first advice given to a student who may struggle in school is to scale back on "extra-curricular" activities. The significant finding that social integration is a strong predictor of intent to persist in college for students with LD should be a reminder that making social connections, balanced with academic efforts, may increase a student's likeliness to persist in college.

Conclusion

This study contributes to the research in several ways. This is the first study to apply Tinto's theory of persistence to a sample of college students with LD. Additionally, this study adds to the LD literature because a model of academic success and intent to persist that includes a variety of variables was tested, rather than testing any one domain of variables in isolation. Finally, this study provides a model to be built upon and altered for future researchers seeking to understand the persistence and academic achievement of college students with LD.

Appendix A

Algorithm used to determine sample size

$N = [\lambda(1 - R^2_{Y*B}) / R^2_{Y*B}] + w$

$N = [11.1 \, (1-.10) / .10] + 2 = 102$

From:

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. (2nd ed).

Hillsdale, NJ: Erlbaum.

Appendix B

ACT - SAT Concordance Table
(Provided by Admissions department of participating university)

ACT	SAT
36	1600
35	1580
34	1520
33	1470
32	1420
31	1380
30	1340
29	1300
28	1260
27	1220
26	1180
25	1140
24	1110
23	1070
22	1030
21	990
20	950
19	910
18	870
17	830
16	780
15	740
14	680
13	620
12	560
11	500

Appendix C

Participating university's recommended measures for documenting LD

Aptitude

- *Wechsler Adult Intelligence Scale - Third edition (WAIS)*
    - o In addition to all required subtests, the Letter-Number Sequencing and Symbol Search subtests are strongly recommended
- *Wechsler Intelligence Scale for Children - Third edition (WISC*)
- *Stanford-Binet Intelligence Scale - Fourth edition*

Academic Achievement

- *Woodcock-Johnson Psychoeducational Battery III - Tests of Achievement*
- *Wechsler Individual Achievement Test (WIAT)*
- *Nelson-Denny Reading Test*

Cognitive/Information Processing

- *Woodcock-Johnson Psychoeducational Battery III - Tests of Cognitive Ability*
    - o In addition to the required standard battery (subtests 1 - 10), the following subtests are strongly recommended:
        - Subtest 12 - Retrieval Fluency
        - Subtest 13 - Picture Recognition
        - Subtest 14 - Auditory Attention
        - Subtest 16 - Decision Speed
        - Subtest 17 - Memory for Words

Appendix D

Demographic Questionnaire

1. Name:_____   **2.** Date:_____

3. Age:_____   **4.**Year in School_____   **5.** Gender: **Male   /   Female** (please circle one)

6. Please indicate your **mother's** highest level of education:

___ Some grade school   ____ Completed 8th grade   ____ Some high school

___ Completed high school   ____ Some college   ____College degree

___ Some graduate school   ____ Graduate degree

7. Please indicate your **father's** highest level of education:

___ Some grade school   ____ Completed 8th grade   ____ Some high school

___ Completed high school   ____ Some college   ____College degree

___ Some graduate school   ____ Graduate degree

8. Race/Ethnicity (**check all that apply and specify where appropriate**):

___ Black (not Hispanic)   ___White   ___Latino/a

___Asian or Pacific Islander   ___Native American

___Other (please specify)_____

9. What is your major?_____

10. At this time, where do you live?

_____On campus: in a residence hall or a fraternity or sorority house

_____With parents

_____Off campus: on own or with roommates

11. At what age_____ or grade_____ were you first diagnosed with a learning disability?

12. What is the area(s) most affected by your LD? Please check all that apply.

_____Reading   _____Writing   _____Spelling   _____Handwriting

_____Oral Expression   _____Social Skills   _____Attention   _____Math

13. Have you ever been diagnosed with ADD or ADHD? **Yes   /   No** (please circle one).

Appendix E
Survey of Academic and Social Integration
(Adapted from Freshman Year Survey, Milem & Berger, 1997)

Following is a list of statements characterizing various aspects of academic and social life at your university. Please indicate the level of your agreement or disagreement with each statement, as it applies to your experience at the University of Arizona, by **circling** the appropriate number. Please mark only one response for each statement.

	Strongly Disagree	Disagree	Agree	Strongly Agree
	1	**2**	**3**	**4**

1. My interpersonal relationships with other students at this university have had a positive influence on my intellectual growth and interest in ideas.   1…...…...2……..…3………..4

2. I am satisfied with my academic experience at this university.   1…...…...2……..…3………..4

3. It has been difficult for me to meet and make friends with other students.   1…...…...2……..…3………..4

4. My non-classroom interactions with university faculty members have had a positive influence on my personal growth, values, and attitudes.   1…...…...2……..…3………..4

5. Few of the faculty members I have had contact with at this university are genuinely interested in teaching.   1…...…...2……..…3………..4

6. I am satisfied with my opportunities at this university to meet and interact informally with university faculty members.   1…...…...2……..…3………..4

7. I am satisfied with the extent of my intellectual development since enrolling at this university.   1…...…...2……..…3………..4

8. My non-classroom interactions with university faculty members have had a positive influence on my intellectual growth and my interest in ideas.   1…...…...2……..…3………..4

9. Few of the faculty members I have had contact with at this university are genuinely outstanding or superior teachers.   1…...…...2……..…3………..4

10. Most of the faculty members I have had contact with at this university are genuinely interested in students.   1…...…...2……..…3………..4

11. My interest in ideas and intellectual matters has increased since coming to this university.   1…...…...2……..…3………..4

12. Most of the faculty members I have had contact with are interested in helping students grow in more than just academic areas.   1…...…...2……..…3………..4

13. Since coming to this university, I have developed close personal relationships with other students.   1…...…...2……..…3………..4

14. Few of the students I know at this university would be willing to listen to me and help me if I had a personal problem.   1…...…...2……..…3………..4

15. My interpersonal relationships with other students at this university have had a positive influence on my personal growth, values and attitudes.   1…...…...2……..…3………..4

16. Since coming to this university I have developed a close, personal relationship with at least one faculty member.   1…...…...2……..…3………..4

17. My non-classroom interactions with university faculty members have had a positive influence on my career goals and aspirations.   1…...…...2……..…3………..4

18. My academic experience at this university has had a strong positive   1…...…...2……..…3………..4
influence on my intellectual growth and interest in ideas.

Based on your judgment right now, what is the likelihood that you will enroll at this university next fall?

19.   1……………….…..2………….……..…3……….…………….4……………………….……5
Extremely   Extremely
Unlikely   Likely

20.   1……………….…..2………….……..…3……….…………….4……………………….……5
Certain *Not*   Certain to
to Re-enroll   Re-enroll

21.   1……………….…..2………….……..…3……….…………….4……………………….……5
No   100% Sure
Chance   to Re-enroll

Appendix F
Item Composition of
Academic Integration and Social Integration Subscales
Adapted from Freshman Year Survey
Berger & Milem, 1999

Scoring	Item

Academic Integration (10 items)

+	I am satisfied with my academic experience at this university.
+	I am satisfied with the extent of my intellectual development since enrolling at this university.
+	My interest in ideas and intellectual matters has increased since coming to this university.
+	My academic experience at this university has had a strong positive influence on my intellectual growth and interest in ideas.
+	My interpersonal relationships with other students at this university have had a positive influence on my intellectual growth and interest in ideas.*
+	My interpersonal relationships with other students at this university have had a positive influence on my personal growth, values, and attitudes.*
-	Few of the faculty members I have had contact with at this university are genuinely outstanding or superior teachers.
-	Few of the faculty members I have had contact with at this university are genuinely interested in teaching.
+	Most of the faculty members I have had contact with at this university are genuinely interested in students.
+	Most of the faculty members I have had contact with are interested in helping students grow in more than just academic areas.

Social Integration (10 items)

+	My interpersonal relationships with other students at this university have had a positive influence on my intellectual growth and interest in ideas.*
+	Since coming to this university, I have developed close personal relationships with other students
+	My interpersonal relationships with other students at this university have had a positive influence on my personal growth, values, and attitudes.*
-	It has been difficult for me to meet and make friends with other students.
-	Few of the students I know at this university would be willing to listen to me and help me if I had a personal problem.
+	I am satisfied with my opportunities at this university to meet and interact informally with university faculty members
+	Since coming to this university I have developed a close, personal relationship with at least one faculty member.
+	My non-classroom interactions with university faculty members have had a positive influence on my intellectual growth and my interest in ideas.
+	My non-classroom interactions with university faculty members have had a positive influence on my personal growth, values, and attitudes
+	My non-classroom interactions with university faculty members have had a positive influence on my career goals and aspirations

Agreement with items marked "+" is consistent with a high score on the scale. Agreement with items marked "-" is consistent with a low score on the scale.
*Indicates item appears on both academic integration and social integration scales.

Appendix G

Informed Consent Form

Project Title:	Achievement and integration factors related to academic success and intent to persist of college freshmen and sophomores with learning disabilities (LD).
Purpose:	This is a research project being conducted by Lisa DaDeppo at the University of Maryland, College Park. We are inviting you to participate in this research because you are a college freshman or sophomore with an LD. The purpose of this research is to investigate achievement and integration factors related to the academic success of college underclassmen with LD.
Procedures:	The procedures of this study involve completing two surveys (a demographic questionnaire and survey of academic and social life) and a consent form granting the researcher, Lisa DaDeppo, permission to access through the Disability Resource Center and the Office of the Registrar your cumulative college GPA at the end of the Spring 2006 semester, *SAT* scores, and overall high school GPA. It will take me no more than 30 minutes to complete these instruments.
Confidentiality:	In order to keep your personal information confidential, the following steps will be taken: (1) Upon completion of all data collection your name will be removed from all data files and surveys and replaced with a numerical id; (2) No person other than the researcher, Lisa DaDeppo, will have access to the documents or numerical id code; and (3) At no time will your name, responses, or personal information be released to any other party.
Risks:	There are no known risks for you if you participate in this project
Benefits:	This research is not designed to help you personally, but the results may help the investigator learn more about factors that impact the academic success of college students with LD. We hope, that in the future other people might benefit from this study through improved understanding of how past achievement and current integration affects the academic success of college students with LD.
	Further, you will receive a $5.00 food vendor coupon, as well as the

opportunity to enter a raffle to win one of three cash prizes in the amount of $100.00, $75.00, and $50.00 as a thank you for your participation in this study.

Freedom to Withdraw:

Questions:

Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you are otherwise qualified.

This research is being conducted by Lisa DaDeppo at the University of Maryland, College Park. If you have any questions about the research study itself, please contact Lisa DaDeppo at: 520-529-2913 or LMWD@comcast.net.
You may also contact Dr. Deborah Speece at: The University of Maryland, 1240F Benjamin Building, College Park, Maryland, 20742.

Statement of Age and Consent:

If you have any questions about your rights as a research participant or wish to report a research-related injury, please contact: Institutional Review Board Office, University of Maryland, College Park, Maryland, 20742; irb@deans.umd.edu; 301-405-0678.

I state that I am at least 18 years of age; the research has been explained to me; my questions have been answered; and I freely and voluntarily choose to participate in this research project.

I understand that by participating in this survey I agree with the above statements and give my informed consent.

_____

Name of Participant (Please Print)

_____   _____

Signature of Participant   Date

Appendix H

Project Title: Achievement and integration factors related to academic success and intent to persist of college freshmen and sophomores with learning disabilities (LD).

Permission to access educational records consent form

I grant permission to the Office of the Registrar and the Disability Resource Center (DRC) at the University of Arizona to release to Lisa DaDeppo, for purposes of her research, my **cumulative college GPA** at the end of the spring 2006 semester, **entrance exam scores *(SAT / ACT)***, and overall **high school GPA**. I understand this information will be held in confidence and only Ms. DaDeppo will have access to it.

_____   _____

Name (Please Print)   Phone number

_____   _____

Signature   Date

Appendix I

Raffle Entry Form

Project Title: Achievement and integration factors related to academic success and intent to persist of college freshmen and sophomores with learning disabilities (LD).

Name_____

Address (to be contacted if a winner)_____

_____

_____

Email Address_____

Telephone number_____

**At the end of the study I will draw three names to receive the cash prizes

offered ($100, $75, and $50), as a thanks for participating.

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