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Resilience and College Persistence: Characterizing Students Who Have Failed Courses

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Resilience and College Persistence:
Characterizing Students Who Have Failed Courses

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A dissertation submitted to The Graduate School of University of Missouri–St. Louis
in partial fulfillment of the requirements for the degree
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Abstract

Students who fail a course early in their college careers are at risk of leaving college before completion of their programs. Little is known about this high-risk group and why some members of this group complete their programs while others do not. This research addressed this gap in the college-level persistence literature by focusing first on differences between completers and non-completers, then on differences between students who fail a course early in their college careers but become completers or non-completers. The goal was to understand the protective value of individual traits beyond the prediction of risk based on membership to a high-risk group.

The National Education Longitudinal Study (NELS: 88/2000) database was employed and yielded a rejection of the first two Null hypotheses in this study. It was hypothesized that differences in self-concept, social supports, or locus of control scores exist between completers and non-completers of post-secondary programs for the clusters of variables defined in the NELS: 88/2000 database. It was also hypothesized that there are gender differences in self-concept, social supports, or locus of control scores between completers and non-completers of post-secondary programs for the clusters of variables as defined in the NELS: 88/2000 database before introducing the failing grade variable. Further, these hypotheses were proposed to hold for both four-year degree or higher and two-year certificate/degree or higher students.

Hypothesis three was tested on a subset of the participants with completion status known. The Null hypothesis was not rejected for the subset of participants who earned failing grades. No statistically significant differences were seen for self-concept, social supports, or locus of control scores using the clusters of variables as defined in the NELS:

88/2000 database between students who failed a course and subsequently persisted to completion of a post-secondary program and students who earned failing grades but did not persist to completion. The small n for this subset, however, may have led to a Type II error, and should be investigated further.

Hypothesis four, “Are there gender differences in self-concept, social supports, or locus of control scores using the clusters of variables as defined in the NELLS: 88/2000 database for students who earned failing grades and persisted to completion of a post-secondary program and those who earned failing grades and did not persist to completion?” could not be rejected either, but with an even smaller subset of the data, this may also be a Type II error.

This result prompted the question about what the results would have been for students who did not fail courses. Because this seemed too important to defer for future study, it was necessary to download and analyze the data in the same way for students who attempted postsecondary education without course failure. These analyses demonstrated that the constraining variable was actually the small number of cases of verified course failure or non-failure in this database.

Had the Null hypothesis been proffered for the students who did not fail courses, it would also be rejected for all composite variables for the overall group and for each gender. However, the directional mean differences were counterintuitive for this subset. A higher Locus of Control score corresponds to a higher Internal Locus of Control. Yet, the means in the two Null hypotheses that were not rejected indicated lower scores numerically for completers than non-completers. This was an important finding after seeing numerically higher scores for Locus of Control in the larger subset of participants

for hypotheses one and two, for which the Null hypotheses of no differences were rejected.

The actionable data in the results came in the form of gender differences, though not specifically for participants with course failure data. Gender differences were significant for all Locus of Control and Self-Concept composite variables, as well as the second family composition variable (collected on a later date).

One major implication of this study is the need for further research to identify course failure in postsecondary education, determine the participants' levels of locus of control self-concept and social supports, and then collect longitudinal data on that group for persistence to completion in postsecondary programs. While the two databases included in the Institutional Review Board (IRB) for this study were inadequate to draw conclusions of the nature anticipated, the data revealed other information about the participants that could lead to further research in this area.

The composite variables for family composition yielded little information once the study went to subset analyses. Family Composition composite measures taken twice during the longitudinal study were analyzed as an example of the Social Supports construct chosen for this study. This less robust measure was inadequate to glean actionable information for further research without expanding the measure of Social Supports.

CHAPTER ONE

Introduction

A basic evaluation model of inputs, outputs, and outcomes can illustrate how the diverse stakeholder perspectives at each stage of the higher education process must ultimately converge to focus efforts on the common goal of student success. Legislative stakeholders, who decide funding policies that provide a critical input, and the educators at the front lines of transforming these funds into outputs, need to align their efforts effectively for student success to be an outcome. Considering current economic conditions, it is essential to focus reduced state and federal funding where it can have the greatest impact on student success. Even when challenging economic times are not amplifying the importance of achieving postsecondary education completion with limited input of resources, stakeholders are obligated to maximize completion from the available funds.

Through the current lens of increased scrutiny on postsecondary retention and persistence, accrediting bodies face pressure to focus on improvements in graduation rates for the institutions they oversee. This pressure comes from the highest levels of federal and state governments. Under President Obama, the White House website stated, “The President has proposed incentives for states to maintain their commitments to higher education through a \$1 billion investment. The Race to the Top: College Affordability and Completion challenge aims to increase the number of college graduates and contain the cost of tuition by rewarding states that are willing to systematically change their higher education policies and practices. (p.14)” President Obama’s focus on educating more of our nation’s workforce and raising the number of college graduates in

this country demonstrated the need for action on the part of the entire education community. The current administration has not yet replaced or discontinued this program, and the information is still available on the Department of Education website. It requires more than attracting students to our programs. We must also scaffold them to completion.

Another aspect of this study is the economic significance. Enrollment administrators generate data representing dollars lost each year by student attrition. The University of Missouri–St. Louis summarized costs to the university in tuition revenue lost due to attrition to demonstrate the financial incentive on a local level for year-to-year student retention. This study determined that student attrition from fall 2011 to fall 2012 cost the university a total of \$5,789,045 for all undergraduate levels.

Tuition structures are credit hours based in most 4-year institutions. Some have provisions for full-time students that allow additional coursework with no additional fee beyond a certain number of credit hours. This makes the full-time equivalent (FTE) measure a critical piece of information in costs per student. According to the Integrated Postsecondary Education Data System (IPEDS) glossary, “The full-time equivalent (FTE) of students is a single value providing a meaningful combination of full-time and part-time students. IPEDS data products currently have two calculations of FTE students, one using fall student headcounts, and the other using 12-month instructional activity. (p.228)”. For Federal compliance reporting, the definition given in this glossary for the fall student headcounts calculation is, “The full-time equivalent (headcount) of the institution's part-time enrollment is estimated by multiplying the factors noted below times the part-time headcount. These are then added to the full-time enrollment

headcounts to obtain an FTE for all students enrolled in the fall. This formula is used to produce an FTE that is used annually in the Digest of Education Statistics (p.84)". For public 4-year institutions, the part-time undergraduate headcount factor is 0.403543, and for private 4-year institutions, it is 0.392857. For graduate students the factor is 0.361702 for the public sector and 0.382059 in the private sector. Alternately, "The number of FTE students is also calculated based on the credit and/or contact hours reported by the institution on the IPEDS 12-month enrollment (E12) component and the institution's calendar system, as reported on the IC Header component. (p.85)". This is different for different calendar systems. For example, for semester and trimester instructional activity, one FTE is equal to 30 credit hours over a 12-month enrollment period for undergraduates, and 24 credit hours for graduate students.

Figure 1, from the report, "State Higher Education Finance (SHEF) FY 2013" provides data from a project of the staff of the State Higher Education Executive Officers (SHEEO) headquartered in Boulder, Colorado, with the assistance of The College Board. It illustrates changes in full-time equivalent (FTE) funding by state and reveals the ever-increasing shift of the financial burden to the student in many of the states. According to this graphic, the overall state-funding drop in the United States was 23.0%, yet some states showed more drastic decreases and only a few states showed increased funding. The timeframe for these data encompassed a period of the great recession beginning with fiscal year 2008, which represented the 2008-09 school year and ended in fiscal year 2013- the 2012-13 school year. The most recent fiscal year data, shown in Figure 2, still illustrates the seriousness of the situation in which we now must provide students with postsecondary education. While much improved since the great recession, some states

still lag in funding. It also informs the debate about student loan debt now swirling in our country. It is such an important point of discussion that Senator Elizabeth Warren authored a bill to amend the Higher Education Act that would provide for refinancing of student loans to address some of the burden students have undertaken. This loan burden affects students who do not persist to completion of their college programs as well as those who graduate.

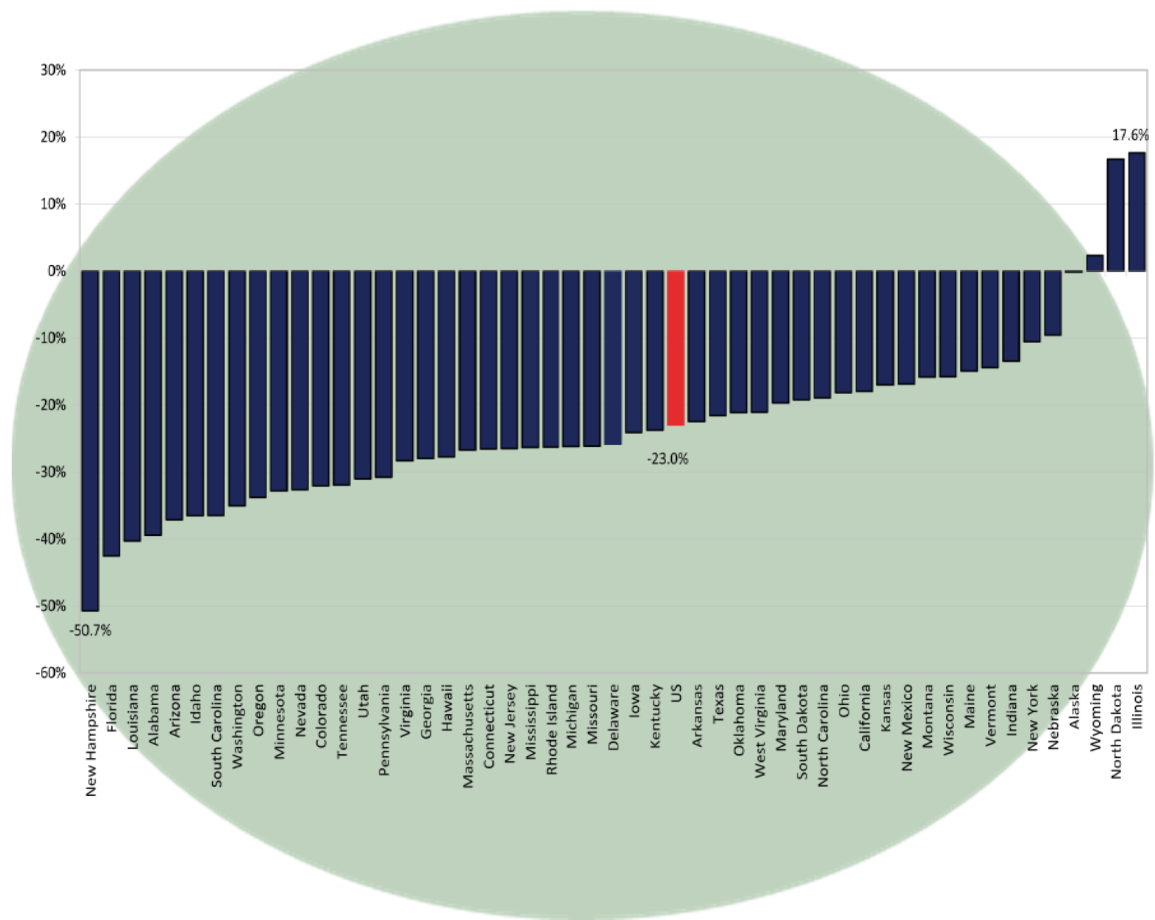
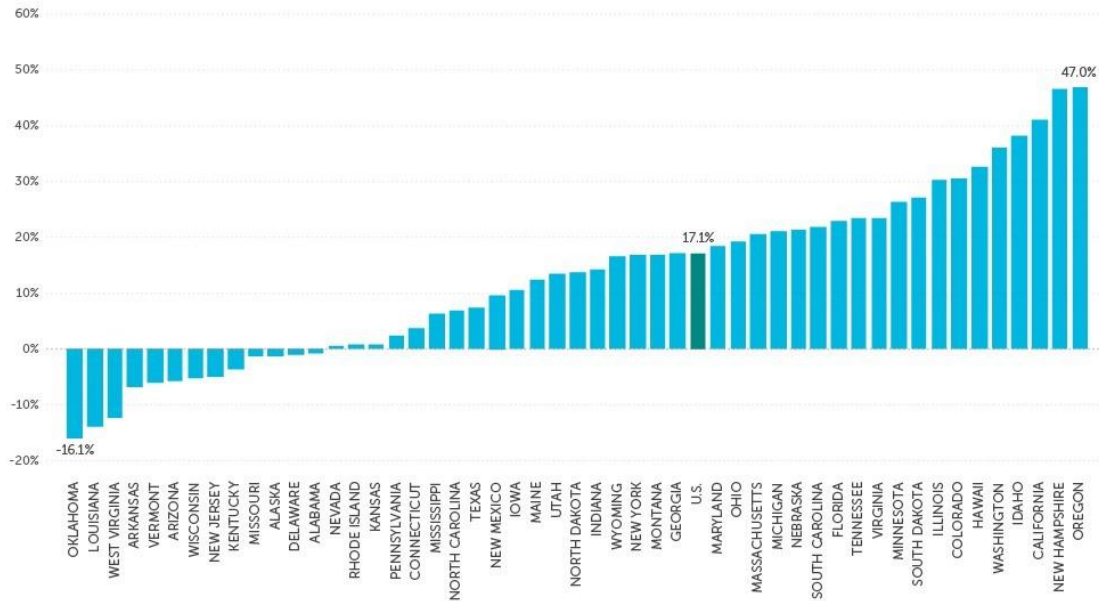


Figure 1. Educational Appropriations per FTE Percent Change by State, Fiscal 2008-2013. Dollars adjusted by 2013 HECA, Cost of Living Adjustment, and Enrollment Index. Adapted from “State Higher Education Finance (SHEF),” 2013, p. 26. Adapted with permission

**PUBLIC HIGHER EDUCATION EDUCATIONAL APPROPRIATIONS PER FTE:
PERCENT CHANGE, FY 2012-2017**



- NOTES:**
1. Educational appropriations are a measure of state and local support available for public higher education operating expenses including ARRA funds, and exclude appropriations for independent institutions, financial aid for students attending independent institutions, research, hospitals, and medical education.
 2. Adjustment factors to arrive at constant dollar figures include Cost of Living Index (COLI), Enrollment Mix Index (EMI), and Higher Education Cost Adjustment (HECA). The Cost of Living Index (COLI) is not a measure of inflation over time.
 3. For Illinois, a \$1.25 billion back payment in FY 17 to their historically underfunded higher education pension program resulted in past legacy pension funds accounting for 37.8 percent of all educational appropriations. The substantial increase in appropriations per FTE for Illinois between 2016 and 2017 was primarily due to institutions receiving 30 percent of their annual state appropriations (compared to levels in adjacent years).

SOURCE: State Higher Education Executive Officers

Figure 2. Educational Appropriations per FTE Percent Change by State, Fiscal 2012-2017.

It is just as disadvantageous to burden a student with excessive college loan debt without program completion as it is to fund grants for students who do not complete. Beyond the economic impact, there are also other consequences of completion or non-completion, though some are less quantifiable than resource consumption. Considering the expense of higher education and the societal cost to everyone involved when students do not complete, stakeholders have a collective interest in promoting persistence to degree completion.

Student success in higher education is typically measured as persistence to completion of a degree or certificate program. This study initially focused on students who experienced failing grades yet persisted to the completion of a degree program within eight years. The choice of the eight-year data point was based on the Integrated Postsecondary Education Data System (IPEDS) federal reporting requirement to track graduation rates at four, five, six, and eight years.

The existence of the IPEDS federal compliance data collection agency has added standardization to definitions for retention and graduation rates and to the methods for calculating them. While the methods may not afford a perfect measurement for either outcome, it is now possible to be certain that one is getting the same information from each institution when looking at data for these measures. Both methods have been consistent for quite some time, making longitudinal comparisons more useful.

Former Education Secretary Margaret Spellings embarked on a campaign for improved transparency and accountability in higher education following the release of the report from the Commission on the Future of Higher Education that she appointed, “A Test of Leadership: Charting the Future of U.S. Higher Education” (2006). One of the recommendations of this report was that “...information should be made available to students and reported publicly in aggregate form to provide consumers and policymakers an accessible, understandable way to measure the relative effectiveness of different colleges and universities” (p. 4). Dr. Spellings then charged the National Center for Educational Statistics (NCES) with developing platforms to provide the data collected through IPEDS to a broader audience.

This initiative fostered information sharing and a new era of transparency. While early versions of the NCES systems were somewhat awkward and required a higher level of technical skill to use, it is now possible for even a parent or student to find individual institution data online easily with the NCES College Navigator and the College Scorecard.

The current administration of Secretary DeVos is continuing the College Scorecard measurement of postsecondary institution costs with a website for parents and students to find schools with low costs, default rates and average student debt. On September 26, 2018 the department announced that the national cohort default rate (CDR) for student loans had fallen from 11.5% to 10.8% for the most currently available three-year rate. This is the lowest rate since the three-year CDR was first released in 2012. The College navigator website is also currently available for more in-depth searches with many variables to review for each college. This is a continuing function of the need for transparency in postsecondary education data for informed decision making.

Researchers can access the IPEDS Data Center database online to analyze large groups of institutions. This database includes all reporting United States institutions and hundreds of variable choices, including multiple years of data. Since any institution that receives Title IV financial aid funds must comply with these reporting requirements, the data for both retention and graduation rates are comprehensive.

An institution begins the process of generating both retention and graduation rate data by determining the starting cohort of first time, full-time freshmen each fall. It then follows this set cohort of students for eight years, with an emphasis on the first- to second-year retention rate, and the fourth, fifth, and sixth years' graduation rates. For the

aforementioned, data such as gender (see Table 1) and ethnicity make a richer resource and are available for public use online.

Even the students who transfer out of an institution are tracked through the National Student Clearinghouse at the sixth year and reported in the IPEDS data to further enhance the value of the database. However, these transferred-out students do not contribute toward an institution's official graduation rate. Data for the eight-year graduation rate are not disaggregated by gender or ethnicity, nor is a transfer-out data point included. Since the eight-year graduation rate is not disaggregated by gender, those data are not included in Table 1.

Table 1
Gender and Time to Degree

	Overall	Public	Private Nonprofit	Private for-profit
	(%)	(%)	(%)	(%)
All students				
4 years	40.6	35.5	53.5	18.7
5 years	55.8	53.8	63.7	23.6
6 years	59.8	58.9	65.9	25.6
Men				
4 years	35.5	30.3	48.2	22.9
5 years	52.0	49.9	60.0	26.6
6 years	56.6	55.7	62.6	28.1
Women				
4 years	45.0	40.0	57.7	14.5

5 years	59.0	57.1	66.7	20.5
6 years	62.5	61.7	68.5	23.0

Note. Graduation rates of bachelor’s or equivalent degree-seeking students at the Title IV, 4-year institution where the students started as full-time, first-time students, by control of institution, gender, and time to degree after entry: United States, cohort starting year 2010. Adapted from “U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS),” Adapted from table prepared December 2017, *Graduation Rates component*.

Note: Title IV institutions are those with a written agreement with the Secretary of Education that allows the institution to participate in any of the Title IV federal student financial assistance programs. The rates in this table reflect only students seeking bachelor’s or equivalent degrees, rather than all students at 4-year institutions. The graduation rate was calculated as required for disclosure and reporting purposes under the Student Right-to-Know Act. This rate is the total number of completers within the specified time to degree divided by the revised cohort after allowable exclusions. The revised cohort is the number of students entering the institution as full-time, first-time degree- or certificate-seeking undergraduates in the cohort year. Allowable exclusions included students who died or became totally and permanently disabled; students who left school to serve in the armed forces; students who left to serve with a foreign aid service of the federal government, such as the Peace Corps; and students who left to serve on official church missions.

These persistence measures are valuable to trend for individual institutions, sectors, or as a whole. Much of the research in persistence, though, is focused on predicting who is likely to stay in school and why. This helps to inform program decisions for preventing dropouts but has limitations that result from the generalizations that occur when one is unable to isolate variables, such as group membership (e.g., gender or ethnicity).

Background of the Study

Persistence prediction in educational literature is comprehensive. However, research on students who earned failing grades and then persisted to completion is sparse. Within

the category of students who earn failing grades, it was useful to compare students who subsequently persisted to completion with those who did not. Comparing these two very different outcomes possibilities for students by analyzing data collected to indicate levels of characteristics related to Locus of Control, Self-Concept, and Social Supports was planned to generate actionable data that could assist decision makers in higher education.

Typical research on resilience provides insight into student characteristics that are considered risk or protective factors and predict degree completion. This analysis identified factors for students with known outcomes to assist educators with the difficult task of allocating resources where they have the most impact on students who have demonstrated the risk-model predicted behavior(s). Without knowing how the protective factors may be operating as a function of whether someone persists in the face of experiencing early failure or not, the literature is incomplete.

Much work has been done in persistence to completion since Vincent Tinto proposed his “multidirectional model” of factors involved in the decision to drop out of college (1975, p. 95). Some researchers have attempted to validate that model (Bean, 1985; Devonport & Lane, 2006; Pascarella & Chapman, 1983), while others have proposed modifications to it (Cabrera, 1992). Yet, as noted on the jacket of the latest book by Tinto about the subject, “Much remains to be done toward improving student success” (Tinto, 2012).

It was useful to begin with Tinto’s original prediction model (1975), shown in Figure 3. This model relates a complex story in a diagram that combines key information gathered from previous research on persistence to completion into one clearer picture of the mechanisms at work. The interaction among the many factors that researchers

believe either place students at risk for becoming non-completers or provide support to allow students to persist can be seen as operating within a framework, rather than as individually-functioning influences. His risk and protective factors both include aspects of locus of control, self-concept, and social supports. His research shows that exploring the interaction among these factors can help to form a clearer picture for understanding persistence decisions.

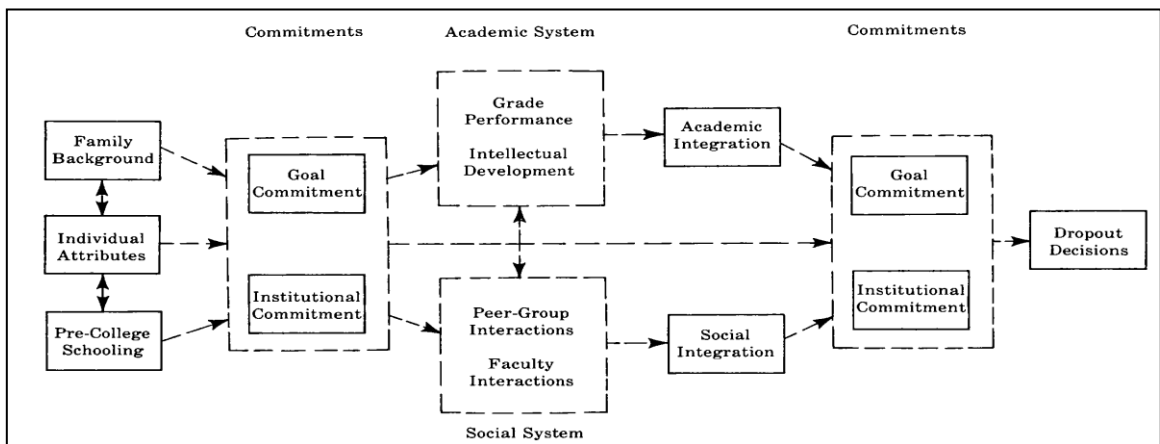


Figure 3. Theoretical Model of College Withdrawal. Adapted from Tinto, 1975, p. 95. Adapted with permission.

There are categories of factors that Tinto (1975) determined to be highly predictive of persistence. Among these are not only student characteristics, but also facets of the academic setting in which the student is pursuing postsecondary education. Together with distinct individual attributes, several classifications of factors have been determined to predict with a high degree of accuracy just which students will persist. The model incorporates research on resilience with protective factors that students who persist are believed to have.

Over the decades since postsecondary educators began to incorporate the knowledge base for persistence, many student-success programs have been implemented in the United States. These programs range from peer tutoring support to student engagement initiatives. The constant among these endeavors is the need to allocate resources toward their undertaking.

To focus these efforts to improve student success, others have begun their research with Tinto's 1975 model of complex interactions that effectively integrated academic, commitment, and social factors into a framework so that relationships could be examined quantitatively. Such subsequent research serves not only to validate the model, but also to reinforce the notion that the factors do not operate in isolation. For example, Pascarella and Chapman (1983) researched resilience factors from Tinto's model and determined associated effect sizes for the interactions. The results of their analysis are illustrated in Figure 4.

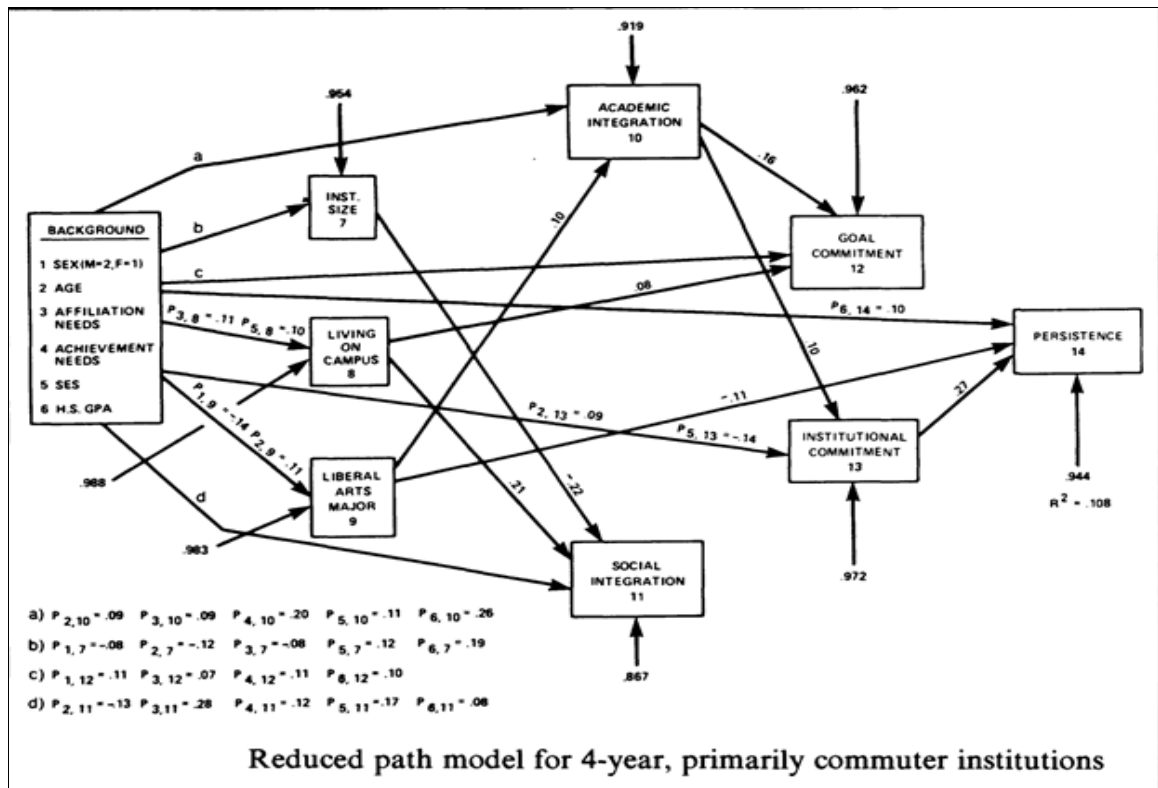


Figure 4. Path Analytic Validation of College Withdrawal, Reduced path model for pooled sample. Adapted from Pascarella & Chapman, 1983, p. 95. Adapted with permission.

As can be seen in the pooled sample results, even factors that do not directly affect persistence show indirect influence through these paths. One example of this is the influence of academic integration (10) on institutional commitment (13), thereby indirectly influencing persistence. In fact, this model only demonstrates three direct effects. These are background, institutional commitment (positive influence) and majoring in liberal arts (negative influence).

In Tinto's seminal volume of why certain students persist to completion in undergraduate programs, he provides insight that continues to influence research in the field over 40 years after its first printing (1975). His model includes factors that address characteristics that students bring to the institution, such as ability, background, goals,

and objectives. These interact with the academic and social integration that the institution provides.

While Tinto clearly studies persistence to gain insight into the issues that may be actionable by higher learning institutions, his goal is not to put retention above education (1975, 1993, 2012, and 2017). Instead, he attempts to find elements within the programs themselves that may be affecting the student's decision to leave college. In doing so, he hopes to improve the overall education for the student rather than merely improve retention for the institution. His model is based on unique individual responses to the factors he examines. His student-centered approach represented a change in direction from early researchers in this field (Astin, 1970; Spady, 1971).

From the many factors incorporated into such models, there are three protective factors included in this study. Resilience research provides a solid foundation for this focus. The three factors are as follows: an internal locus of control, a strong sense of self-concept, and robust social supports.

Locus of Control, Self-concept, and Social Supports

Julian B. Rotter described the theory of locus of control in his original monograph that identified the construct as control of reinforcement (Rotter, 1966). The Rotter Internal External Scale of Locus of Control measures the degree that a person believes an event to be "contingent upon his own behavior or his own relatively permanent characteristics" -- internal control-- or "controlled by forces outside himself and may occur independently of his actions" -- external control (Rotter, 1966, p. 1). This is an important concept in the study of resilience for areas as diverse as education, parenting, and even career and prison studies. In education, Locus of Control influences persistence by its very nature. A

student with an internal Locus of Control considers his or her behavioral effects on outcomes, where a student with an external Locus of Control takes less responsibility for the outcomes of his or her efforts. This sense of personal responsibility is important for persistence to degree completion (Tinto, 1975, 1993, and 2012) as a protective factor.

Self-concept beliefs influence student performance by either bolstering or undermining one's efforts. Shavelson, Hubner, & Stanton (1976) described Self-concept as a person's perceptions of him- or herself. Further, they state that these perceptions are influenced by environment. In their original "Structure of Self-concept" Model (Shavelson et al. 1976, p 413), there are subsets of general Self-concept which include academic, social, emotional and physical. These Self-concept studies relating to student performance are valuable in the field of resilience for the insight they provide into protective factor mechanisms.

Research shows that social supports can also promote resilience in students (Pascarella, Terenzini, and Wolfe, 1985; Pascarella and Terenzini, 2005; Cabrera, 1992; Tinto, 1975, 1993, and 2012). These supports can be advisors, tutors, peers, faculty, clergy, or family. Social supports at the institution level can be costly to provide and are often the focus of cutbacks in bad economic times. Tinto's 2017 model incorporates the similar concept of sense of belonging as an influence on motivation to persist. Other researchers use sense of belonging to predict persistence (Han, Farruggia, and Moss, 2017). They found that sense of belonging, measured by the Johnson et al. Overall Sense of Belonging subscale, was correlated with retention. This study generates actionable knowledge in these areas for the most effective scaffolding of the vulnerable students who have experienced failing grades at the beginning of their postsecondary experience.

Problem Statement

When using persistence prediction models and effects sizes for factor interactions to describe students placed at risk, there remained a need to characterize students who have actually failed courses. In 2010 the National Center for Education Statistics (NCES) publicly released the database for the National Education Longitudinal Study (NELS) that began in 1988 (NELS: 88/2000), which provides considerable data for analyses that may fill this void. Analyzing these factors in this database provided the potential to inform programs that support postsecondary persistence to graduation, an area of concern for many stakeholders. Students, parents, college administrators, taxpayers, and businesses who need highly qualified employees all feel the effects of college persistence levels.

Identifying risk factors, such as those in Tinto's original model (1975), can help predict who will choose to leave college. However, to optimize resources for the common goal of student success, this research moves beyond models that use prediction indicators to assign group membership. Studying the students who have not successfully completed coursework to find commonalities expands our knowledge base in this area.

If, for example, a family background characteristic such as low socioeconomic status is determined to predict risk, a student in that "group" is assigned risk prediction at a certain level based solely on the group membership. This serves to reinforce stereotypes, rather than explain the individual characteristics that determine which low socioeconomic status students will fail courses and then drop out of college, and which students will fail courses but persist to completion. The individual characteristics are thus perceived as functions of group membership rather than the intricate fabric of person-specific traits

that provide deeper understanding of the very essence of educational resilience. This study sought to highlight on the need to avoid the leap from correlation based on group membership to labelling students as merely members of that group, while ignoring other important characteristics that would differentiate among them.

Purpose of the Study

This research supplements previous research by describing students who have actually completed postsecondary programs or dropped out of those programs as well as and those who fail courses then complete or drop from postsecondary programs. Predicting the outcomes of persisting to completion or dropping out of college before course failure is the focus of much of the literature heretofore. Once post-secondary completers are compared to non-completers for self-concept, social supports, and locus of control for differences, these factors in students who experienced failing grades and did not drop out of college can be analyzed to compare to students who earned failing grades and did drop out of college. This would be a significant addition to previous research. This research addressed the gap in the college-level persistence literature and focus first on differences between students who complete post-secondary and non-completers, then on differences between students who fail a course early in their college careers but become completers or non-completers. This is to understand the protective value of individual traits beyond the prediction of risk based on membership to a high-risk group. The completion of postsecondary and the earning of failing grades then became the group memberships. From the group of students that failed a course those who persist to degree completion are compared to those who leave without completion of a degree. These data are

contrasted with the data for the initial question asking if the group of students who do not complete have different mean scores than the group of students who do complete.

Research Questions

The research questions addressed by this study were:

- 1) Are there differences in self-concept, social supports, or locus of control scores between completers and non-completers of post-secondary programs using the clusters of variables as defined in the NELS: 88/2000 database before introducing the failing grade variable?
- 2) Are there gender differences in self-concept, social supports, or locus of control scores between completers and non-completers of post-secondary programs using the clusters of variables as defined in the NELS: 88/2000 database before introducing the failing grade variable?
- 3) Do students who earned failing grades and subsequently persist to completion of a post-secondary program have different self-concept, social supports, or locus of control scores using the clusters of variables as defined in the NELS: 88/2000 database than students who earned failing grades but did not persist to completion?
- 4) Are there gender differences in self-concept, social supports, or locus of control scores using the clusters of variables as defined in the NELS: 88/2000 database for students who earned failing grades and persisted to completion of a post-secondary program and those who earned failing grades and did not persist to completion?

Delimitations of the Study

This research sampled only the NCES NELS survey data (NELS: 88/2000) study population. The 2010 public release of the NELS: 88/2000 complete database composed of the initial grade eight survey and all subsequent surveys through high school and college makes this analysis possible for the first time. Previously, this was a restricted-use data file. Within the NELS: 88/2000 database, the analyses included variables relating to self-concept, locus of control, and social support. The partitioning that occurred within the samples was by gender, based on the disparity of graduation rates between male and female degree-seeking students, as shown in Table 1. This investigation did not include analyses of other disaggregation of the sample data.

Limitations

In this study, the number of students in the sample meeting specified criteria was not adequate for each of the subsets. Although the overall population from which the sample was taken was quite large, once specific cases were selected, certain subsets did not result in statistical significance to generalize beyond the sample.

Additionally, there was a limitation of selected data being self-reported. While the indirect data are gathered from multiple sources, not every aspect was triangulated. This subjectivity influences the resulting data for certain factors. However, by carefully choosing record data for the course failure grouping, and using variable clusters for the characteristics, it was possible to reduce the concern about subjectivity for this study.

It was difficult to isolate the variables of interest from other influencing factors. An effort to determine the extent to which these influences can be accounted for in the

analyses was made, and several concerns noted. Models from previous researchers were used to guide the analyses in a way that optimizes the significance of the analyses.

Definitions

Attrition: Attrition refers to the rate of students leaving an undergraduate program before completion.

Completion 1: Completion initially referred to earning a 4-year degree or higher, thereby completing the postsecondary program in which they enrolled.

Completion 2: Completion also subsequently referred to earning a 2- or 4-year degree or professional certification, thereby completing the matriculated postsecondary program.

This alteration was used to accommodate smaller subsets of the database but was subjected to the same background analyses as Completion 1 to determine the viability of modification.

Educational Attainment: Degree earned, or years of schooling completed.

Full-time Equivalent (FTE): References to FTE in this research use the IPEDS definition for calculating student enrollments:

The number of FTE students is calculated based on fall student headcounts as reported by the institution on the IPEDS Enrollment (EF) component (Part A). The full-time equivalent (headcount) of the institution's part-time enrollment is estimated by multiplying the factors noted below times the part-time headcount. These are then added to the full-time enrollment headcounts to obtain an FTE for all students enrolled in the fall. This formula is used to produce an FTE that is used annually in the Digest of Education Statistics.

- Part-time undergraduate enrollment

- Public 4-year (.403543)
- Private (not-for-profit and for-profit) 4-year (.392857)
- Public 2-year and <2-year (.335737)
- All other institutions (.397058)
- Part-time graduate enrollment
 - Public 4-year (.361702)
 - Private (not-for-profit and for-profit) 4-year (.382059)

Locus of Control (from the NELS Documentation): “Locus of Control refers to the extent to which individuals believe that they can control events that affect them. Individuals with a high internal locus of control believe that events result primarily from their own behavior and actions. Those with a high external locus of control believe that powerful others, fate, or chance primarily determine events. Those with a high internal locus of control have better control of their behavior and tend to exhibit more political behaviors than externals and are more likely to attempt to influence other people; they are more likely to assume that their efforts will be successful. They are more active in seeking information and knowledge concerning their situation than do externals. The propensity to engage in political behavior is stronger for individuals who have a high internal locus of control than for those who have a high external locus of control.”

Persistence: Refers to the continuation to completion of a college program.

Pipeline: This is often described as a traditional college experience where a student enters a degree program after high school and continues in the same program through completion.

Resilience: The ability to overcome adversity.

Retention: Returning to college each fall and spring semester until completion.

Protective Factors: These are the buffers to the conditions of risk in some individuals, when others are unable to surmount the same obstacle.

Risk Factors: Influences or conditions which research has shown are likely to increase a student's susceptibility to leaving college.

Self-Concept: Students' perceptions about themselves.

Social Supports: Any areas of positive social interaction that scaffold the student were considered a social support for the purpose of this study.

Swirling: This is a term describing the more complex patterns of enrollment involving the movement among various institutions for different coursework.

Significance of the Study

The significance of this study is the potential to reveal characteristics of students who actually exhibited the behavior that the persistence literature tries to predict from risk and protective factors. Characterizing the two samples of the population: those who earned a failing grade but persisted, and those who earned a failing grade but did not persist; would have complemented previous prediction studies. Once individual characteristics were the focus, rather than group membership correlations, having failed courses became the new group identity, and the two possible outcomes became the independent variables for analysis.

The analyses in this study are to supplement the research in the field of resilience that educators look to for insight into the nature of risk and protective factors. This improved insight can lead to focusing more efficiently the ever-decreasing resources available for scaffolding student persistence to completion of college. Intervention programs such as

First-Year Experience resources, Peer Tutoring Labs, Advising Services, or Academic Study Skills Sessions all need funding to continue and are often among the first resources to suffer reductions. Financial aid packages may even need to become more flexible about extending the length of time that grants and loans are given for undergraduate work.

CHAPTER TWO

Literature Review

Much of the research that has been done in persistence to completion since Tinto proposed his “multidirectional model” of factors is either validation of the model’s predictive value, or refinements to it. This model, shown in Figure 3, tells a complex story about the interaction among the many factors that are considered by researchers to either place students at risk for becoming non-completers, or provide support to allow students to persist. Adelman (2006) used the NELS: 88/2000 database to examine characteristics of student pathways to completion and found what he calls “swirling” (the movement among various institutions for different coursework) to be the pathway for over half of college students. In one study of the Utah System of Higher Education (USHE), swirling is documented (Curtin, 2017). This research shows that 30% of students who matriculated in 2007-08 and graduated with a degree or certificate by 2015 in the USHE attended at least one other institution within the system. It also revealed that 54% of students changed which degree was pursued from original entry intent. This included students at the two-year level who went on to complete four-year degrees, and four-year students who went on to complete graduate degrees.

Such pathways have diverged sufficiently from the long-held expectations of a “pipeline” through higher education that institutions are now obligated to report 200% (8-year) graduation rates (IPEDS, 2009). Researchers need to consider the impact on resilience that these more complex patterns of college attendance have, rather than focusing only on resilience in the traditional linear pathway (Horn, Berger, & Carroll,

2004). NELS: 88/2000 allows the researcher the opportunity to follow students through this 200% graduation rate with the 1992, 1994, and 2000 follow-up data.

Resilience

Luthar, Cicchetti, and Becker (2000) conducted meta-evaluation of the literature in order to trace the historical development of early research around the area of resilience. The beginning of this research in the early 1970s was the study of atypical schizophrenics. Later in the decade, researchers focused on children of schizophrenic mothers. This focus gradually expanded to identifying the many risk and protective factors that are studied today.

The authors described misleading labels, such as the early term for resilient, which was *invulnerable*. This was based on thinking that adaptation was a fixed measure, rather than a relative one. Others thought that the resilience label was less appropriate than the broader term “positive adjustment” (Luthar et al., 2000, p. 553). These issues precipitated confusion and criticism.

Luthar et al. thoroughly reviewed the difficulties of operationalizing and measuring risk and protective factors. However, the value of identifying themes across studies with diverse samples and approaches emerges from even widely disparate studies. This kind of evaluation is valuable for present-day researchers in providing pertinent background information on the evolution of resilience research and basic terminology. Additionally, Luther et al. regard the influence of biology on resilience as an interesting direction for further study. They both summarized significant research across a broad spectrum of studies and provided useful tools with which to assess subsequent research in this field.

In a newer study, Edwards, Catling, and Parry (2016) examined resilience in students and young people. The study consisted of 161 participants and relied on self-report responses. The resilience scale was the Connor-Davidson Resilience Scale 25 (CD-RISC-25), the measure of exposure to adverse events was the Adverse Childhood Experiences International Questionnaire (ACE-IQ), and the Rotter Locus of Control Scale was used to gauge the students' Internal versus External orientation. Participants also took the College Student's Stressful Event Checklist and the Academic Delay of Gratification Scale (ADOGS).

Of the measures analyzed, the study shows that in the sample of 16 to 21-year-old participants, those with an internal locus of control and those with a low adversity relationship with parent(s)/guardian(s) had higher levels of resilience. These predictors were independently significant. Academic Delay of Gratification was not significantly predictive of resilience.

These examinations of resilience suggest that there are risk and protective factors that have a role in determining how adversity affects people. Knowing that adversity can be overcome, it is important to research factors such as locus of control and family situations for correlations with positive adjustment. This study addressed the role of locus of control, family composition and self-concept in resilience.

Persistence

McCluskey (2005) provided a comprehensive review of persistence models in her study of minority persistence. She began with the empirical model developed by Spady in 1971 from the Durkheim suicide research of the late 1800s. Spady's model used such variables as social integration, family background and friendship/support to predict the

decision to drop out of college. She further described Astin's 1970 model, which simply includes Inputs (student characteristics and credentials), Environment (college experience), and Outputs (grades and persistence to degree), and is unidirectional. She noted that in 1975, Tinto introduced a multidirectional model showing complex interactions among disparate factors.

She also studied many subsequent models that built on or incorporated much of Tinto's original model. This study included models developed by Cabrera, Volkwein, St. John, and Below. The complex interactions originally proposed by Tinto integrated academic and social factors into a framework from which one might perform quantitative analyses. Other researchers have attempted to validate that model quantitatively (Bean, 1985; Devonport & Lane, 2006; Pascarella & Chapman, 1983).

McCluskey's study used national data sets and incorporated the categories from Tinto's model as a guide for the influencing factors included in the analyses. Of the 51 variables that she chose to analyze, 48 significantly correlated to the persistence from first to second year in college. There were several strong correlations, such as loans, which were negatively associated with persistence for all students and grants, which were positively associated with persistence for minority students. Work study was positively associated with persistence for both white and minority students.

In his volume on why some students persisted to completion in undergraduate programs while others did not, Tinto (1975, 1993) provided insights that continued to influence research over the next 40 years. His original model, shown in Figure 3, included factors that addressed characteristics the student brings to the institution, such as ability, background, goals, and objectives. These interact with the academic and social

integration that the institution provides for the student. More recently, Tinto wrote a text that focused on institutional actions to influence completion (Tinto, 2012). The most recent Tinto research (2017) moved from the lens of institutional action to the perspective of the student. Tinto sought to lay out a “conceptual model of student institutional persistence as seen through the eyes of the students” (Tinto, 2017, p.254), however, he eventually evaluates the implications for the institutional action toward persistence. He acknowledges that student goals can be different from university goals. That is, while most students want to complete a degree, they do not necessarily feel they have to do so at the institution where they began the journey.

He proposed a model that starts with student goals feeding into motivation, which is also fed by (and feeds) self-efficacy, sense of belonging, and perception of curriculum. The model concludes with persistence. His view is that persistence is not the only articulation of motivation, although without it, persistence is not probable. This model describes the influencing factors not just as inputs to, but also interactive with, motivation and each other.

While Tinto was clearly studying persistence to glean insight into the issues that may be actionable by higher learning institutions, his goal was not to put retention above education. Instead, he attempted to find issues within the programs themselves that may be affecting the student’s decision to leave college. In doing so, he hoped to improve the overall education for the student, rather than merely improve the retention bottom line for the institution. His theories are based on unique individual responses to the factors he examines. This student-centered approach represented a change in direction from previous researchers.

Again, it is the interaction among the many factors that operate within a framework, rather than merely as individually functioning influences, that may either place students at risk for becoming non-completers or provide support to allow persistence to completion. His posited risk and protective factors both include aspects of locus of control, self-concept, and social supports. This research shows that exploring the interaction among these factors can help to form a clearer picture for understanding persistence decisions.

Drawing on Tinto's original model of persistence, Bean (1985) attempted to dissect the reason these factors influence a student's decision to leave college. Because only one institution was represented in the sample he studied, his work is not generalizable, but it appears to yield important information about influences on students. For instance, he attributes attitude development more to other students than to faculty.

Bean admitted to his model being less useful with upperclassmen who drop out before matriculating. It was also not the case that GPA was significantly correlated with the drop-out syndrome he described. This directly contradicts other research.

An interesting belief Bean shared was that "grade inflation can be better explained by students actively changing faculty attitudes toward grades than by a sudden increase in the competence of students" (p. 61). He took this premise a step further by commenting that we have overrated the role of faculty-student contact. However, his recommendation that peer interaction may be a reasonable intervention is certainly not without merit.

In a publication from the National Center for Educational Statistics (NCES), Adelman (2006) provided analysis on the NELS: 88/2000 data. In general, the data supported the premise that the pipeline metaphor for progressing from high school to one

college until degree completion is no longer adequate as linear paths become less common. The author described more complex patterns of enrollment chosen by over half of college students, such as swirling, a term describing the movement among various institutions for different coursework. In fact, one in four undergraduate students in the sample set attended more than two institutions.

This sample was the second of its kind to be studied for college trends, with the original group having reached high school graduation age in 1982. The comparisons between groups revealed interesting similarities, new patterns, and even some progress in areas such as achievement gaps. The data supported a positive influence of partnerships between postsecondary and secondary education on student success. The number of credit hours completed by the end of the first full year played a key role in persistence to completion. The terminology discussion made a distinction between retention and persistence. The use of retention was seen to be unnecessarily controlling, while persistence could include a variety of paths toward completion.

Horn, Berger, and Carroll (2004) also analyzed the data set that Adelman (2006) used but focused on the difference in the rate of completion between the two groups. While Adelman's analyses included more detail on other aspects of the persistence issue, the Horn et al. study sought to determine whether these rates are changing. The difficulty with this comparison began in the sample population distribution differences, which changed between the two data points. During the six years between the two data points, certain demographic shifts altered the composition of the population for the second group.

While Horn et al. found that actual completion time was lengthening, they also found the percent of completers increased. This report described distributions of the populations and gave information about background characteristics for the sample. There was also information about the tuition increases and financial aid availability. One interesting outcome of the combined changes in these two areas has been an increase in student loan debt.

In a review of over 500 studies on financial aid and retention, Murdock (1989) found a correlation between lack of aid and a decrease in persistence. Reporting only on those with clearly defined variables of financial aid and persistence, he considered fewer than 100 of the studies for inclusion. Subsequently, only 49 of the studies made it to the actual sample set. Considering this outcome, loan debt increase has significance.

Using students who did not receive financial aid as the control group and financial aid students as the treatment group, Murdoch's meta-analysis concluded that "financial aid could be expected to move the typical person from the 50th percentile to the 55.2 percentile of persistence for the non-recipient aid population" (p. 7). Although the generally accepted guidelines for effects size are not met with the $+0.132$ that Murdock called statistically significant, his explanation using the normal curve is an interesting view.

Within the financial aid group, minority students showed an effect size of -0.2206 . Murdock interpreted that to mean a persistence rate of 41.3% of the non-minority financial aid group. He believed that although much research shows that financial aid helps considerably improve minority persistence, it appeared from this data that financial aid did not overcome all the obstacles for them to reach the level of non-minorities.

In “How College Affects Students,” Pascarella and Terenzini devoted an entire chapter to educational attainment and persistence research (2005, pp. 373-444). They presented an overview of studies on many of the factors that Tinto and others determined to affect persistence. Some factors came from personal dispositions or characteristics, while others included intervention program evaluations, the latter being of interest for the main theme of the book. Studies were categorized not only by interceding variable, but also partitioned into pre- and post-1990s research. They posited that the research produced since the 1990s has had a greater focus on the conditional effects of college on student attainment. They point out that the drawback is that neither era has routinely had reproducible studies for these measures, likely due to the unique nature of programs and the varying levels of program implementation.

Tinto (2012) also addressed institutional interventions and the varying results that are seen in the literature. His research led him to summarize four conditions for student success: expectations, support, assessment with feedback, and involvement. He described in detail what the literature indicated to be the critical issues for implementation and evaluation, as well as methods developed to overcome obstacles.

His prescriptions for improving student attainment outlined strategies whereby universities can be intentional and focused. He provided evidence-based methods for planning and implementing high-impact programs with the fewest resources. Even long-advocated programs such as the first-year seminar can be made more meaningful using the evidence he has compiled.

Persistence research is complex and wide-ranging. For the original models, interventions were seen as prescriptive. Over time, the variable of persistence took on a

less global meaning. Looking at persistence by gender, ethnicity and socio-economic status added value to the factors in the original models. To find actionable data for increased persistence requires a more specific approach to the variables that contribute to the knowledge base and allow interventions to succeed. This review demonstrated a gap in the literature on students who have actually experienced course failure but persisted to completion.

College Entrance Tests and Retention

Lotkowski, Robbins, and Noeth (2004) authored ACT policy research from twenty years of historical data and three national studies on retention practices. However, policy also appeared to be influenced by Corporate America. Their study of college retention focused on graduation rates and provided insight into some of the correlations found in the three major studies.

Lotkowski et al. admitted that there was stronger prediction from high school GPA (.448) than from the ACT scores (.388) for college GPA, which matched what other studies have shown. However, their data analysis found socioeconomic status below the ACT in predictor value for college GPA (.155), but above the ACT for predicting retention (.228 vs. .124). The tables also listed predictor value of non-academic factors which were highly predictive, including “academic related skills” (.366), “academic self-confidence” (.359), and “academic goals” (.340) for retention. For college GPA prediction both “academic self-confidence” (.496) and “academic motivation” (.303) were strong predictors. Lastly, when ACT scores, high school GPA, socioeconomic status, and academic self-confidence and achievement motivation were combined, they predicted 26% of the college GPA.

Kobrin and Milewski (2002) also analyzed GPA, but with SAT scores. Their focus was on discrepancies. Students who had more than one standard deviation of difference between high school GPA and SAT had very different demographics than the 2/3 of students who fell within one standard deviation in either direction. It would seem that the over-represented groups may have specific or unique characteristics that lend themselves to such discrepancies. Although the conclusion of the College Board was that there is no evidence that minorities were unfairly disadvantaged by the SAT, it does appear that there is room for additional research into the reasons for the discrepancies.

Ishitani and Snider (2006) analyzed data on 4,445 students who took ACT or SAT preparation courses in high school. Instead of researching their transition into college from high school as a function of these courses, they looked instead at their college persistence. While many characteristics comprise a student's likelihood of taking such a course in the first place, the fact remained that having taken one of the courses correlated with a significantly higher rate of college completion.

Another finding of note was that the sample produced similar results to other research for parameters, such as the significance of grants in the freshman year for increasing completions, and the greater likelihood of first-generation college students leaving the second year. The breakdown by quintiles for high school class rank had an unusual pattern of dropout year likelihood. For instance, the lowest quintile students were more likely to drop out in the 3rd year.

This literature included evidence that college entrance tests alone show weak prediction of college GPA and persistence to completion of college. When combined with high school GPA and non-academic factors such as academic self-confidence, the

predictive value in one of the studies increased. This leads to one of the questions for this research, which is the role of self-concept in persistence.

Locus of Control, Self-Concept and Social Supports

Julian B. Rotter described the theory of locus of control in his original monograph that identified the construct as control of reinforcement (Rotter, 1966). The Rotter Internal External Scale of Locus of Control (see Attachment I) measures the degree that a person believes an event to be “contingent upon his own behavior or his own relatively permanent characteristics,” internal control, or “controlled by forces outside himself and may occur independently of his actions,” external control (Rotter, 1966, p. 1). This is an important concept in the study of resilience for areas as diverse as education, parenting, and even career and prison studies. Students with an internal locus of control believe that they have more say in outcomes than those with an external locus of control. Persistence requires taking control of one’s circumstances to effect change.

Rotter’s study focused on educational resilience. When students believe that their actions determined the outcome of events rather than luck, their approach to education is very different from students who believe that the consequences of their actions are not in their control. Lefcourt (1976) showed that students with an internal locus of control are more successful at acquiring and using knowledge than their peers with an external locus of control.

Early research on locus of control included behavior modification interventions such as attribution and persuasion training (Miller, Brickman, & Bolen, 1975). Attribution training included using feedback statements that describe good performance on an assignment as though it were an attribute of the student. Persuasion, on the other hand,

included feedback about what a student should be able to do, not what his attributes for doing it were. The data in this research showed a positive result for the attribution training, but not for the persuasion training.

Self-concept can be defined broadly as a person's perception of himself. This perception can influence one's actions, but one's actions can also influence self-concept (Shavelson, Hubner & Stanton, 1976). This provides a challenging construct to measure. Shavelson, et al. proposed a hierarchical model of self-concept (p. 413). This model starts with the idea of general self-concept which is comprised of academic and non-academic self-concept. The academic self-concept can be further broken down into specific subjects and the non-academic into social, emotional or physical self-concept. There are additional component dimensions and these subareas of self-concept include behaviors in specific situations which can be evaluated.

Albert and Dahling (2016) studied the relationship between locus of control and self-concept. Along with learning goal orientation, there is a positive direct effect that can predict academic self-concept. The study showed that when locus of control was high, learning goal orientation and academic self-concept had a stronger positive relationship, leading to a positive effect on GPA for the one-year later measurement.

Marsh (1990) used data from a national Youth in Transition study with a sample size of 1,456 public school males. These data were collected in grades 10, 11, 12 and one year after secondary school. This study demonstrated that while prior year self-concept significantly affected subsequent grades, prior reported grades had no significant effect on self-concept. The data strongly support the self-concept enhancement model relating prior self-concept to subsequent achievement. This study would have been more robust if

there had been multiple indicators of each construct, but the test-retest model was central to the study and required using consistent indicators from year to year.

Research shows that social supports can also promote resilience in students (Pascarella, Terenzini, & Wolfe, 1985; Pascarella & Terenzini, 2005; Cabrera, 1992; Tinto, 1975, 1993, and 2012). These supports can be advisors, tutors, peers, faculty, clergy, or family. Social supports at the institution level can be costly to provide and are often the focus of cutbacks in bad economic times. The present study generated actionable knowledge in these areas for the most effective scaffolding of the vulnerable students who have already experienced failing grades.

Gender Differences

The NCES dataset from IPEDS released in 2017 confirms that more women complete college than men in the United States (U. S. Department of Education). This dataset also shows that the gender gap is growing. Franke, Hurtado, Pryor, and Tran (2011) used an earlier NCES dataset in a compilation for the Higher Education Research Institute at UCLA. The report notes the narrowing of the gender gap from 4-year completion rates to 5- and 6-year rates and posit that factors such as longer program majors men choose could be impacting time to completion.

Jones (2010) investigated gender differences as a function of the institutional commitment benefits from social integration. Although multi-institutional, the sample was for private, religion-specific colleges and universities. This limited dataset, however, indicated that the correlation between social integration and subsequent institutional commitment, though positive for males, was not as strong as for females.

A review of the relationship between locus of control and gender differences yielded research showing that males exhibit a more internal locus of control than females. Zaidi and Moshin (2013) and Cairns, McWhirter, Duffy, and Barry (1990) reported that females have a more external locus of control than males, who displayed greater internal locus of control. Another study on gender differences involved the locus of control model of internalizing and externalizing problems, but Leadbeater, Kuperminc, Blatt, and Hertzog (1999) found greater female vulnerability to internalizing problems and greater male vulnerability to externalizing problems from very early adolescence. These seemingly discrepant studies may indicate that confounding variables influenced the findings.

Differences in outcomes by gender in the literature informed this research into persistence. Questions remained about using the same retention methods for males and for females. If, for instance, self-concept is higher in males than in females, would it make sense to work more on that issue with female students to improve outcomes associated with higher self-concept? If locus of control is more external for females, are there techniques that could assist females with taking greater control of their outcomes? These questions led this researcher to further investigate gender differences in this study.

Literature Summary

The literature review gave an account of many facets of student behaviors. The resilience section demonstrated that adversity responses can be influenced by risk factors and protective factors which make a difference in outcomes. Such

characteristics as those in this study (locus of control, self-concept and family supports) can be either risk or protective factors for positive adjustment.

Persistence literature provided models for factors that contribute to successful outcomes. These models demonstrated interaction among the factors that operate within a framework and can put students at risk of dropping out of college or provide supports that lead to completion. The decision to leave college is a complex one for any student. Interventions by the college are incorporated into many high impact programs from first year seminars to peer tutoring. While much is known about allocating resources to scaffold student persistence, much remains to be learned.

College entrance tests are touted as a method of determining college readiness and likely success. While the literature showed some predictive value, there were other characteristics such as high school GPA and non-academic factors which can combine with the test score to make a better indicator of success. One interesting study demonstrated that taking an entrance exam preparation course correlated with a significantly higher rate of college completion. This could be attributed to many possibilities, including the mere likelihood of who would be taking the preparation course in the first place or what motivates someone to do so.

Locus of control, self-concept, social supports and gender differences are critical to this research and are shown in the literature to be factors which influence resilience and persistence. The extent to which they related to degree completion was the core of the analyses. The literature supported the expectation that high self-concept, internal locus of control and strong social supports (family being the focus in this case) lead to greater persistence and completion in college. The database for

this study was expected to also reflect this. However, the differences for students who have previously failed a course remained uncertain until analyzed.

The gender literature indicated a higher completion rate for females overall. How this was affected by the gender differences in self-concept, locus of control and social supports remained a question. The effect of gender for students who failed a course was also still a concern.

CHAPTER THREE

Methods

NELS: 88/2000 now consists of a longitudinal database from grade 8 through high school, college, and beyond and is a valuable resource to researchers. The questions that this researcher studied are addressed in various segments of the NELS: 88/2000 data collections. Starting with NELS: 88/2000, and then partitioning the data specifically for the research questions, provided a rich source of information to analyze.

The study of persistence to completion of a postsecondary program can be done from many perspectives. Among these are predictor models that incorporate risk factors, from researchers such as Tinto (1975), Spady (1971), Bean (1985), and Pascarella and Chapman (1983). While there are students placed at-risk based on membership in demographic categories who meet the criteria of even the models that have predictive validity, the outcome can still fail to meet the prediction.

This study addressed this gap in the literature by characterizing the group of students who did earn failing grades, not just studying the predictive value of known factors for identifying students who might fail. This methods chapter describes the analyses that this researcher performed to add a new perspective to the literature around persistence to completion. It details the population and samples, explains the instrumentation used in the process, outlines the procedures, provides the design and analyses performed, lists the limitations of the study, and summarizes the reason for using this approach to answer the research questions.

Population

The data were taken from the NCES NELS survey data (NELS: 88/2000) collected on the 8th grade class of 1988, with four follow-ups in 1990, 1992, 1994, and 2000. There were 1,052 schools and 25,000 students sampled, and data were collected from parents, teachers, students, transcripts, course offerings, etc. Both public and private schools are included in the sample.

This sample was the second of its kind to be studied for college trends, with the original group having reached high school graduation age in 1982 (NCES, 2003). With the knowledge gained from the first study, and implementation of improved methods, NELS: 88/2000 became a landmark data collection that has not been equaled in scope at any time since. The full database was made publicly available in 2010. Until then, it was a restricted-use file.

Sampling Procedures

NELS: 88/2000 is a national probability sample from a national frame of 39,000 schools with eighth graders. The school level was the first stage sampling unit, and students within the school were the second stage. Although 1,057 public and private schools cooperated, only 1,052 contributed usable student data. Of those contributing usable data, there were 815 public schools and 237 private schools. There were 26,435 individual students randomly selected, with 24,599 contributing usable data (NCES, 2003).

The database organization maintains confidentiality for the participants in the study. None of the unique identifiers used to connect variables will include information that could threaten confidentiality. The specifics of the data-use agreement were

available to the Institutional Review Board (IRB) at the University of Missouri–St. Louis to determine the recommendation of the researcher to allow the use of this database as an exempt source, due to the handling of human subjects concerns at the outset of the data collection. The IRB granted approval on August 7, 2013.

Instrumentation

A base-year study in 1988 used student questionnaires that covered demographic information and opinion items. The database also includes a series of cognitive tests in reading, mathematics, science, and social studies, scaled using item response theory, to generate standardized scores. Administrators, teachers, and parents were also surveyed. Supplementary information came from transcripts and course offerings.

The first follow-up year added a drop out questionnaire, high school effectiveness study (HSES) and a base-year ineligible study (BYI). In the second follow-up, there was an early graduate supplement. The third follow-up year survey (1994) assessed students for employment, postsecondary education, perceptions, feelings, and behaviors. The last follow-up was in 2000, and again surveyed the participants on employment, postsecondary education, perceptions, feelings, and behaviors (NCES, 2003).

The reliability and validity of the NELS: 88/2000 database for cognitive tests are well established in the National Institute of Statistical Sciences/Education Statistics Services Institute (2005) publication. Reliability ranges from .73 for first year science to .94 for second follow-up math using the Item Response Theory (IRT) model. Construct validity was established with intercorrelation among content areas of .72, .75, and .76 for 8th, 10th and 12th grades respectively. Additionally, other researchers (e.g., Adelman (1999, 2006), Horn and Chen (1998) and Horn, Berger, and Carroll (2004)) have

contributed to the knowledge base of this longitudinal study with studies that used NELS data to show relationships between patterns of enrollment and persistence to degree completion.

This database was analyzed using Statistical Package for Social Sciences (SPSS). The variables were identified in the codebook provided by NCES. Variable identification was aligned to the research questions as closely as possible for the survey items in the database. For instance, several variables considered together are an indicator for locus of control. Among these are ten survey questions ranked on a four-point Likert scale. Such determinations, where available, are useful to provide the most reliability for the sample.

The description from the NELS data documentation states that in the base year survey and in each follow-up survey, students were asked to indicate the extent to which they agreed or disagreed with 13 statements about themselves. These statements were combined into two composites, locus of control and self-concept, which provide a bridge to other social research efforts, including the NLS-72 and HS&B surveys (NELS Data Documentation Codebook). The items included in the variable clusters are listed as follows in the manual:

- A. I feel good about myself.
- B. I don't have enough control over the direction my life is taking.
- C. In my life, good luck is more important than hard work for success.
- D. I feel I am a person of worth, the equal of other people.
- E. I am able to do things as well as most other people.
- F. Every time I try to get ahead, something or somebody stops me.
- G. My plans hardly ever work out, so planning only makes me unhappy.

H. On the whole, I am satisfied with myself.

I. I certainly feel useless at times.

J. At times I think I am no good at all.

K. When I make plans, I am almost certain I can make them work.

L. I feel I do not have much to be proud of.

M. Chance and luck are very important for what happens in my life.

Cluster variables for Self-Concept (items A, D, E, H, I, J, and L) and Locus of Control (items B, C, F, G, K and M) were available for more than one survey interval. The base-year survey item, #44, first follow-up item, #62, and second follow-up, #66, questions were all identical. The teen level measure was used in this study since the composition of the clusters had been refined by that time, and because previous research indicates an increased likelihood of multiple coping styles in older students (Ding, 2013). That knowledge supported teen measures as more closely aligned than earlier measurements with the coping mechanisms employed as the participant makes decisions about postsecondary education options.

At the teen level, there were three cluster variable options each for Locus of Control and Self-Concept. Attachment IV provides the technical information describing the cluster score derivations for locus of control and self-concept. Recoded variables were created with values in the reverse order for "positive" questions so low to high values reflect the same dimensions as other questions. Variables are set to missing if not a value that reflects an available option.

The data analyses compared the non-completer group and the completer group for any of the locus of control, self-concept, or family composition composite variables

derived from the responses collected in the surveys. The decision to look at the complete group of participants who had experienced course failure, and then of the females and males, was based on the number of cases in the entire group. The subgroups were small, but valuable to assess for future comparisons with other datasets.

Procedure

Using the Electronic Codebook for the NELS dataset, specific students were selected based on grade indicator items. The failing grades may have been present at any one of the longitudinal collection times. Failing grade earners are one of the two focus groups of the study the other being the full group of participants with known completion status. The characterization of these students as a group is not enough, thus the characterizations compare those who persisted to completion with those who did not. Comparisons between completers and non-completers are for individual variables and clusters of variables that comprise the constructs.

It was useful to do gender partitioning for these variables and clusters of variables, despite inadequate populations for some subsets. In “The Condition of Education 2018,” issued by the U.S. Department of Education, data about completions by gender show that women have significantly higher completion rates overall. Specifically, 57% of male and 63% of female first-time students who sought a bachelor’s degree completed a bachelor’s degree at that institution within 6 years. At public institutions, about 62% of females seeking a bachelor’s degree or its equivalent graduated within 6 years, compared with 56% of males (Entering Cohort 2010). The gender partitioning allowed comparisons within gender and between genders for both sample groupings. No other partitions were attempted.

Research Questions

The research questions addressed by this study were:

- 1) Are there differences in self-concept, social supports, or locus of control scores between completers and non-completers of post-secondary programs using the clusters of variables as defined in the NELS: 88/2000 database before introducing the failing grade variable?
- 2) Are there gender differences in self-concept, social supports, or locus of control scores between completers and non-completers of post-secondary programs using the clusters of variables as defined in the NELS: 88/2000 database before introducing the failing grade variable?
- 3) Do students who earned failing grades and subsequently persist to completion of a post-secondary program have different self-concept, social supports, or locus of control scores using the clusters of variables as defined in the NELS: 88/2000 database than students who earned failing grades but did not persist to completion?
- 4) Are there gender differences in self-concept, social supports, or locus of control scores using the clusters of variables as defined in the NELS: 88/2000 database for students who earned failing grades and persisted to completion of a post-secondary program and those who earned failing grades and did not persist to completion?

Research Design/Methods

The design for this study was descriptive for the traits identified as factors for self-concept, locus of control, and social supports, and the presence or absence of the actual

behavior of failing grades among students. These traits reflect this research's focus on the effect of educational resilience issues on persistence to completion. Of this group, analyses compared students who persisted to completion and students who did not, to determine whether differences between the two samples were significant for any of the variables identified in the dataset.

The full NELS database was downloaded as a Statistical Package for Social Sciences (SPSS 20) file from the official website for the U.S. Department of Education, NCES using the Education Data Analysis Tool (EDAT). The EDAT allowed variable searching to build a syntax file, which was then used with the full SPSS database to select only variables included in this study for analysis. The full NELS master database includes 7,450 variables and 12,144 original cases. Using the EDAT made it possible to produce a subset that contained only 119 variables, chosen to use as described in the previous chapter.

The codebook designated the variable for completion data as F4HHDG, which provided the highest level of attainment data for participants who attempted postsecondary education. Because SPSS allows for recoding of variables into different variables, it is possible to keep the original data and add the new version using the parameters that allow for a customized analysis. This variable was recoded to eliminate missing or skipped cases and to partition the levels into "yes" and "no," based on completion of a postsecondary program or not. Before reducing the database to the subset for those who failed courses, the research question one and two analyses used bachelor's degree or higher to better align with prior research that this study sought to support. Further recoding to include associate degrees and certificates as completions

was subsequently necessary for research questions three and four, hence, data were generated using this definition of the variable for research questions one and two, as well.

The process for analyzing the subset of participants who failed a course to compare the variables between completers and non-completers began with case selections. It was possible to exclude the cases for individuals who did not exhibit the behavior of failing a course from all subsequent analyses. The variable for course failure was F2D24J. The codebook listed only “yes” or “no” for data. The missing and skipped cases were eliminated by recoding the variable to blanks for those cases. To test for gender differences, data sets within NELS were partitioned to differentiate among the genders.

The variable F4SEX is the gender category the respondent gave when completing the year 2000 survey. The case processing summary for females who failed a course that could be included in the locus of control analysis shows the exclusion of six female participants from the 110 total n leaving 104 cases for analysis. This small n , however, led to even smaller groups of completers or non-completers.

Research Question	Data	Analyses
1) Are there differences in self-concept, social supports, or locus of control scores between completers and non-completers of post-secondary programs using the clusters of variables as defined in the NELS: 88/2000 database before introducing the failing grade variable.	1) Scores on self-concept, social supports, or locus of control cluster variables w/ persistence 2) Scores on self-concept, social supports, or locus of control cluster variables w/o persistence	One-way ANOVA means testing
2) Are there gender differences in self-concept, social supports, or locus of control scores between completers and non-completers of post-secondary programs using the clusters of variables as defined in the NELS: 88/2000 database before introducing the failing grade variable?	1) Scores on self-concept, social supports, or locus of control cluster variables w/ persistence by gender 2) Scores on self-concept, social supports, or locus of control cluster variables w/o persistence by gender	
3) Do students who earned failing grades and subsequently persist to completion of a post-secondary program have different self-concept, social supports, or locus of control scores using the clusters of variables as defined in the NELS: 88/2000 database than students who earned failing grades but did not persist to completion?	1) Scores on variable clusters for failing grade earners w/ persistence 2) Scores on self-concept, social supports, or locus of control cluster variables for failing grade earners w/o persistence	
4) Are there gender differences in self-concept, social supports, or locus of control scores using the clusters of variables as defined in the NELS: 88/2000 database for students who earned failing grades and persisted to completion of a post-secondary program and those who earned failing grades and did not persist to completion?	1) Scores on self-concept, social supports, or locus of control cluster variables for failing grade earners w/ persistence by gender 2) Scores on self-concept, social supports, or locus of control cluster variables for failing grade earners w/o persistence by gender	

Figure 5. Data Analysis Design Chart.

The first data output provided a case processing summary table to situate the results of the two means comparison tables for each individual analysis. That report provided the number and percent of the total cases that were excluded and that were included. These data are not included in that format. However, tables with mean values, number of participants by category, and standard deviation are reported here in the tables for each study variable. The means comparisons in SPSS include ANOVA tables, which were used in the analyses that were performed to test for differences between the completers and non-completers for all. The one-way ANOVA determined the significance of numeric differences seen in the descriptive statistics tables generated.

Analyses used the locus of control cluster in Figure 5 as described. The self-concept cluster was the second measure in this study. Due to the lack of a robust social

supports cluster variable, analyses used the family composition cluster to represent one measurable aspect of social supports. Family is a critical component of social supports for students at all levels (Pascarella, Terenzini & Wolfe, 1985, Pascarella & Terenzini, 2005, Cabrera, 1992, Tinto, 1975, 1993, and 2012).

The first analyses were of the entire sample of participants with known completion status to determine if the locus of control, self-concept, and the social support of family were different in individuals who persisted to completion of postsecondary education programs than in non-completers. Completers include any student who persisted to the completion of a postsecondary program. The expectation from the literature reviewed for this study would be that the analyses would support rejecting the Null hypothesis of no differences between completers and non-completers for these three measures.

Another aspect of this analysis before investigating the research question about course failure involved gender differences found in the full sample for the three measures. Analyses between genders for locus of control, self-concept, and the social support of family composition, without regard to persistence, demonstrated the value of the analyses for the subsequent disaggregation by gender to compare completers and non-completers. These analyses for research questions one and two proved the data collected to be a solid basis for the subsequent research questions of this study that included the failing grade variable as outlined in Figure 5. Once the database was prepared for the chosen variables by eliminating the placeholder numbers used to represent missing data, the subsets of the original database were used to proceed with the study.

Limitations

This study was limited to the reliability of self-report for certain variables in the analysis. This indirect measurement made it necessary to look at clusters of items to strengthen the analyses. Other variables, such as failing grades and completion, are transcript records. Items corroborated by more than one source (student, teacher, parent, or administrator) have notations to that effect. The size of sub-samples in this study greatly limited the ability to achieve statistical significance. For those having an extremely small n , the results may not be statistically significant. This is of particular concern with the partitions that involve exhibiting failure by gender for specific factors.

The variable selection in EDAT yielded no comprehensive measure for social supports. The cluster of variables that determined locus of control and the cluster that measured self-concept were robust. However, there was no such cluster of variables for social supports. One major social support indicator, however, is family composition. Due to the lack of a more comprehensive cluster variable, it was practical to analyze the family composition composites for both the first survey year and the second survey year instead. No other combination of available variables had adequately researched substantiation for inclusion. Even though several individual social support items were on the survey, no single variable had sufficient research corroboration to be a comprehensive representative of the characteristic. This analysis included only one aspect of social support rather than eliminate this third measure from the study.

Summary

This study identified a group of individuals who have already experienced completion or non-completion of a post-secondary program of study. Course failure was

subsequently incorporated into the analyses to further supplement current research in the field of college persistence. Analyzing differences between the two sub-samples of completers and non-completers from this group for a clearer understanding of factors that accompany educational resilience added dimensions to the knowledgebase of risk and protective factors currently associated with individual persistence to completion.

CHAPTER FOUR

Results

The initial analyses were on the entire sample, to answer the first and second research questions predicting that the three measures for locus of control, self-concept, and the social support of family composition were different in individuals who persisted to completion of postsecondary education programs than in non-completers. This data had robust n for the analyses. The Null hypothesis for research question one was that there were no differences between completers and non-completers for these three measures. The Null was rejected in the analyses for participants who attempted postsecondary education.

Completers were students who persisted to the completion of a postsecondary program. The question one data, initially generated before reducing the database to the subset for those who failed courses, originally used bachelor's degree or higher to better align with prior research. Further recoding for the subsequent research questions was necessary to include associate degrees and certificates as completions. The data generated did support the literature and illustrates the alignment of the database with the decades of prior research on risk and protective factors. A Null hypothesis, that there were no differences between completers and non-completers for these three measures, was rejected in the question one analyses for both definitions of completer. This was true for the full sample and for each gender subset.

Locus of Control Analyses for All Participants

The NELS database included locus of control data. Table 2 shows the data for the locus of control composite variables, with definition one completers compared to non-

completers. The robust nature of these analyses, with over 8,600 participants still in the project who attempted postsecondary education and reported on completion status by the fourth follow-up survey, gave convincing evidence of the mean differences and the statistical significance of those differences. A higher locus of control score corresponds to increased internal control, which is seen in completers in all three composite measures using this database.

Mean-comparisons in Analysis of Variance testing were used to test for differences between the completers and non-completers for all three composite cluster variables of locus of control. Composite cluster 1 includes BYS44C (Good luck is more important than hard work.), BYS44F (Every time I get ahead, something stops me.), BYS44G (Plans hardly work out, makes me unhappy.). Locus of Control Composite 2 includes BYS44B (I don't have enough control over my life.), BYS44C (Good luck is more important than hard work.), BYS44F (Every time I get ahead, something stops me.), BYS44G (Plans hardly work out, makes me unhappy.), BYS44K (When I make plans, I am almost certain I can make them work.), BYS44M (Chance and luck are very important for what happens in my life.). Locus of Control Composite 2 is also adequately robust for quartile analysis, which provides the third composite variable. The Locus of Control composite 2 cluster yielded 8,645 cases after exclusions. These initial analyses use only bachelor's and above as the successful completion parameter and show statistically significant differences at the $\leq .000$ level.

The subsequent analyses for locus of control incorporated gender. Before comparing males to females, analyses compared whether the group as a whole, or either gender individually, showed differences between completers and non-completers of

attempted postsecondary programs. The variable F4SEX is the gender category the respondent gave when completing the year 2000 survey.

Tables 2 includes data for the locus of control composite variables, with completers of bachelor's degrees or higher compared to non-completers at that level for analysis of female participants and for male participants. The number of female participants still in the project and reporting on completion status by the fourth follow-up survey was again large enough to give a solid picture of the mean differences and the statistical significance of those differences. Females represented over half (54%) of the participants included in the analyses. A higher locus of control score than for males, corresponding to increased internal control, was seen in female completers in all three composite measures. Results show that statistical differences at the $\leq .000$ level.

Table 2 also includes data for the locus of control composite variables with bachelor's completers compared to non-completers for analysis of male participants. The number of male participants still in the project and reporting on completion status by the 2000 follow-up survey was also large enough to provide the statistical power to demonstrate statistical significance of the differences. Males represented under half (46%) of the participants included in the analyses. A higher locus of control score, corresponding to increased internal control, was seen in male completers in all three composite measures. Results show that statistical differences at the $\leq .000$ level exist for the subset of males only, as in the subset before gender was introduced in the analyses and the subset from that of female participants. Table 3 provides the table 2 data, but using definition two, the completion of a two-year or higher postsecondary program for completers.

Table 2

ANOVA Results for Locus of Control Composites for Participants Responding to Completion Follow-up Survey Comparing Four Year (Bachelor's) and Higher Completers with Non-completers

	<u>Completer</u>			<u>Non-completer</u>			<i>F</i>	<i>p</i>
	<i>n</i>	\bar{x}	<i>SD</i>	<i>n</i>	\bar{x}	<i>SD</i>		
Locus Of Control Scores, Composite 1	3803	0.291	0.66	4836	-0.022	0.76	407.100	.000
Locus Of Control Scores, Composite 2	3803	0.243	0.58	4842	-0.012	0.65	359.364	.000
Locus Of Control Scores, Composite 2 Quartile	3803	2.96	1.02	4842	2.52	1.11	371.790	.000
Locus Of Control Scores, Composite 1, Females	2132	0.353	0.63	2551	0.030	0.75	249.697	.000
Locus Of Control Scores, Composite 2, Females	2132	0.292	0.57	2553	0.016	0.65	237.282	.000
Locus Of Control Scores, Composite 2 Quartile, Females	2132	3.04	1.01	2553	2.56	1.12	232.897	.000
Locus Of Control Scores, Composite 1, Males	1671	0.212	0.68	2285	-0.080	0.77	153.918	.000
Locus Of Control Scores, Composite 2, Males	1671	0.179	0.60	2289	-0.044	0.65	121.623	.000
Locus Of Control Scores, Composite 2 Quartile, Males	1671	2.86	1.03	2289	2.47	1.09	135.256	.000

Table 3

ANOVA Results for Locus of Control Composites for Participants Responding to Completion Follow-up Survey Comparing Two Year (Associates) and Higher Completers with Non-completers

	<u>Completer</u>			<u>Non-completer</u>			<i>F</i>	<i>p</i>
	<i>n</i>	\bar{x}	<i>SD</i>	<i>n</i>	\bar{x}	<i>SD</i>		
Locus Of Control Scores, Composite 1	5454	0.191	0.70	3185	-0.012	0.76	157.104	.000
Locus Of Control Scores, Composite 2	5457	0.162	0.61	3188	-0.064	0.65	144.559	.000
Locus Of Control Scores, Composite 2 Quartile	5457	2.82	1.06	3188	2.53	1.12	147.114	.000
Locus Of Control Scores, Composite 1, Females	3084	0.247	0.69	1599	0.042	0.75	87.686	.000
Locus Of Control Scores, Composite 2, Females	3085	0.204	0.61	1600	0.022	0.65	90.056	.000
Locus Of Control Scores, Composite 2 Quartile, Females	3085	2.89	1.06	1600	2.57	1.14	88.048	.000
Locus Of Control Scores, Composite 1, Males	2370	0.117	0.72	1586	-0.067	0.77	59.092	.000
Locus Of Control Scores, Composite 2, Males	2372	0.107	0.62	1588	-0.035	0.66	48.308	.000
Locus Of Control Scores, Composite 2 Quartile, Males	2372	2.74	1.06	1588	2.48	1.09	52.288	.000

This gender partitioning showed mean differences between genders. Without consideration of completion status, the mean scores of females in the background data

subset were numerically higher than the mean scores of males. The data in Table 4 illustrate these differences more clearly. The mean differences between genders were significant, corresponding to higher internal locus of control for females.

Table 4
ANOVA Results for Locus of Control Composites Comparing Genders

	Female			Male			F	p
	n	\bar{x}	SD	n	\bar{x}	SD		
Locus Of Control Scores, Composite 1	4683	0.177	0.72	3956	0.043	0.75	71.872	.000
Locus Of Control Scores, Composite 2	4685	0.142	0.63	3960	0.050	0.64	44.909	.000
Locus Of Control Scores, Composite 2 Quartile	4685	2.78	1.10	3960	2.63	1.08	38.570	.000

Self-Concept Analyses for All Participants

The NELS database included data that were attributed to self-concept. Table 5 shows the data for the self-concept composite variables with definition one completers compared to non-completers for all participants still reporting on the fourth survey. As with the locus of control analyses, over 8,000 participants still in the project and reporting on completion status by this follow-up survey provided a robust measure of the mean differences and the statistical significance of those differences. A higher self-concept score corresponds to a more positive self-concept, which is seen in completers in all three composite measures using this database. Results showed that the differences were statistically significant at the $\leq .000$ level.

Self-concept Composite 1 items include; BYS44A (I feel good about myself.), BYS44D (I feel I am a person of worth, the equal of other people.) BYS44E (I am able to do things as well as others.) and BYS44H (On the whole, I am satisfied with myself.). Self-concept Composite 2 included; BYS44A (I feel good about myself.), BYS44D (I feel I am a person of worth, the equal of other people.) BYS44E (I am able to do things

as well as others.) and BYS44H (On the whole, I am satisfied with myself.), BYS44I (I certainly feel useless at times.), BYS44J (At times I think I am no good at all.), BYS44L (I feel I do not have much to be proud of.).

Table 5 includes the data for the self-concept composite variables with completers compared to non-completers for female participants still reporting on the fourth survey. As with the locus of control analyses, the number of female participants still in the project and reporting on completion status by the fourth follow-up survey was again large enough to give a solid picture of the mean differences and the statistical significance of those differences. Females represented over half (54%) of the participants included in the analyses done before gender partitioning. A higher self-concept score corresponds to a more positive self-concept, which is seen in completers in all three composite measures using this database. Results showed that the differences were statistically significant at the $\leq .000$ level.

Table 5 also includes the data for the self-concept composite variables with completers compared to non-completers for male participants still reporting on the fourth survey. As with the locus of control analyses, the number of male participants still in the project and reporting on completion status by the fourth follow-up survey was again large enough to give a solid picture of the mean differences and the statistical significance of those differences. Males represented less than half (46%) of the participants included in the analyses done before gender partitioning. A higher self-concept score corresponds to a more positive self-concept, which is seen for completers in all three composite measures using this database. Results showed that the differences were statistically significant at the $\leq .000$ level.

Table 5 is the completion definition one data, while Table 6 is the completion definition two data. This gender partitioning showed mean differences between genders. Without consideration of completion status, the mean scores of females for self-concept were numerically lower than the mean scores of males. The data in Table 7 illustrate these differences more clearly. The mean differences between genders were significant, corresponding to higher level of self-concept in males.

Table 5

ANOVA Results for Self-Concept Composites for Participants Responding to Completion Follow-up Survey Comparing Four Year (Bachelor's) and Higher Completers with Non-completers

	Completer			Non-completer			F	p
	n	\bar{x}	SD	n	\bar{x}	SD		
Self-Concept Scores, Composite 1	3805	0.111	0.78	4846	-0.047	0.81	83.705	.000
Self-Concept Scores, Composite 2	3805	0.126	0.69	4846	-0.043	0.70	124.955	.000
Self-Concept Scores, Composite 2 Quartile	3805	2.71	1.11	4846	2.44	1.12	118.115	.000
Self-Concept Scores, Composite 1, Females	2132	0.034	0.78	2553	-0.136	0.81	52.724	.000
Self-Concept Scores, Composite 2, Females	2132	0.042	0.69	2553	-0.123	0.71	63.604	.000
Self-Concept Scores, Composite 2 Quartile, Females	2132	2.58	1.13	2553	2.32	1.11	59.372	.000
Self-Concept Scores, Composite 1, Males	1673	0.210	0.78	2293	0.052	0.79	38.718	.000
Self-Concept Scores, Composite 2, Males	1673	0.233	0.67	2293	0.046	0.68	73.866	.000
Self-Concept Scores, Composite 2 Quartile, Males	1673	2.87	1.07	2293	2.58	1.10	70.184	.000

Table 6
ANOVA Results for Self-Concept Composites for Participants Responding to Completion Follow-up Survey
Comparing Two Year (Associates) and Higher Completers with Non-completers

	Completer			Non-completer			F	p
	n	\bar{x}	SD	n	\bar{x}	SD		
Self-Concept Scores, Composite 1	5460	0.059	0.79	3191	-0.039	0.82	30.488	.000
Self-Concept Scores, Composite 2	5460	0.070	0.69	3191	-0.035	0.71	46.138	.000
Self-Concept Scores, Composite 2 Quartile	5460	2.62	1.11	3191	2.46	1.13	43.321	.000
Self-Concept Scores, Composite 1, Females	3085	-0.020	0.79	1600	-0.133	0.82	21.227	.000
Self-Concept Scores, Composite 2, Females	3085	-0.009	0.70	1600	-0.123	0.72	27.121	.000
Self-Concept Scores, Composite 2 Quartile, Females	3085	2.50	1.12	1600	2.32	1.13	24.644	.000
Self-Concept Scores, Composite 1, Males	2375	0.161	0.77	1591	0.055	0.82	17.319	.000
Self-Concept Scores, Composite 2, Males	2375	0.174	0.67	1591	0.052	0.69	30.666	.000
Self-Concept Scores, Composite 2 Quartile, Males	2375	2.78	1.08	1591	2.59	1.12	29.408	.000

Table 7
ANOVA Results for Self-Concept Composites Comparing Genders

	Female			Male			F	p
	n	\bar{x}	SD	n	\bar{x}	SD		
Self-Concept Scores, Composite 1	4685	-0.059	0.80	3966	0.119	0.79	106.49	.000
Self-Concept Scores, Composite 2	4685	-0.048	0.71	3966	0.125	0.68	133.14	.000
Self-Concept Scores, Composite 2 Quartile	4685	2.44	1.13	3966	2.70	1.10	120.66	.000

Family Composition Data for All Participants

The final measure in this study was an example of a social support that influences persistence. Family composition is one of the influences often cited in the literature (Tinto, 1975, 1993, and 2012) as a factor in educational persistence. While a more robust measure of social supports, such as the composite locus of control variables provided for that measure, was not available in this database, the family composition composite variables did at least provide a multi-dimensional look at a participant's home life.

Version one of the composite variables is derived using only base-year data for participants. The parent survey is the source for both versions, but the second version used data collected at the second follow-up. The lowest numerical rating (*one*) is assigned to the traditional family composition, with both mother and father in the home.

Table 8 shows fewer included cases for the first measure than for the second. This analysis of the family composition composite variables compares completers to non-completers. The robust nature of these analyses, with over 7,500 participants at the time of F1, and over 8,000 at the time of F2, gave a solid picture of the mean differences and the statistical significance of those differences. Results showed that the differences were statistically significant at the $\leq .000$ level. Thus, for both intervals, the lower (more traditional) family composition rating is seen more frequently completers.

Table 8 also shows the data for the family composition composite variables with completers compared to non-completers for female participants. As with the locus of control and self-concept analyses, the number of female participants still in the project and reporting on completion status by the fourth follow-up survey was again large enough to give a solid picture of the mean differences and the statistical significance of those differences.

Females represented more than half of the participants (54% at F1; 52% at F2) in the analyses done before gender partitioning. The lowest numerical rating (*one*) is assigned to the traditional family composition with both mother and father in the home. Results for females at both intervals again showed that the lower family composition rating is seen more frequently in completers. The differences were statistically significant at the $\leq .000$ level.

Table 8 includes the data for the family composition composite variables with completers compared to non-completers for male participants. As with the locus of control and self-concept analyses, the number of male participants still in the project and reporting on completion status by the fourth follow-up survey was large enough to provide a sound measure of the mean differences and the statistical significance of those differences.

Males represented less than half of the participants (46% at F1, and 48% at F2) included in the analyses. Recalling from the earlier description, the lowest numerical rating (*one*) is assigned to the traditional family composition, with both mother and father in the home. Results for males at both intervals again showed that the lower family composition rating is seen more frequently in completers than in non-completers. The differences were statistically significant at the $\leq .000$ level. Table 8 is the completion definition one data, while Table 9 is the completion definition two data.

Table 8

ANOVA Results for Family Composition Composites for Participants Responding to Completion Follow-up Survey Comparing Four Year (Bachelor's) and Higher Completers with Non-completers

	Completer			Non-completer			F	p
	n	\bar{x}	SD	n	\bar{x}	SD		
Family Composition Scores, Composite 1	3482	1.520	1.28	4252	1.940	1.57	162.604	.000
Family Composition Scores, Composite 2	3660	1.680	1.46	4619	2.240	1.82	228.010	.000
Family Composition Scores, Composite 1, Females	1924	1.540	1.30	2221	1.960	1.58	85.091	.000
Family Composition Scores, Composite 2, Females	2046	1.730	1.51	2382	2.320	1.88	131.428	.000
Family Composition Scores, Composite 1, Males	1558	1.490	1.24	2031	1.920	1.57	78.659	.000
Family Composition Scores, Composite 2, Males	1614	1.610	1.39	2237	2.140	1.75	101.871	.000

Table 9
ANOVA Results for Family Composition Composites for Participants Responding to Completion Follow-up Survey Comparing Two Year (Associates) and Higher Completers with Non-completers

	Completer			Non-completer			F	p
	n	\bar{x}	SD	n	\bar{x}	SD		
Family Composition Scores, Composite 1	4913	1.630	1.38	2821	1.960	1.58	92.18	.000
Family Composition Scores, Composite 2	5220	1.820	1.58	3059	2.280	1.83	141.30	.000
Family Composition Scores, Composite 1, Females	2738	1.660	1.40	1407	1.980	1.58	46.688	.000
Family Composition Scores, Composite 2, Females	2922	1.890	1.64	1506	2.360	1.89	75.125	.000
Family Composition Scores, Composite 1, Males	2175	1.590	1.35	1414	1.930	1.58	47.171	.000
Family Composition Scores, Composite 2, Males	2298	1.740	1.50	1553	2.190	1.77	73.161	.000

This gender partitioning showed mean differences between males and females. Without consideration of completion status, the mean ratings in females for family composition were numerically higher than the mean scores of males. The data in table 10 illustrate these differences more clearly. The mean differences between genders were significant at F2, but not at F1, indicating that females at F2 had a less traditional family.

Males represented less than half of the participants (46% at F1, and 48% at F2) and females represented more than half of the participants (54% at F1, and 52% at F2) included in the analyses done before gender partitioning. Whether or not this 2% shift from F1 to F2 was an influence on the differences is undetermined. Even the total number of participants with a useable rating for F2 is considerably higher than for F1.

Table 10
ANOVA Results for Family Composition Composites Comparing Genders

	Female			Male			F	p
	n	\bar{x}	SD	n	\bar{x}	SD		
Family Composition Scores, Composite 1	4145	1.770	1.47	3589	1.730	1.46	1.337	.248
Family Composition Scores, Composite 2	4428	2.050	1.74	3851	1.920	1.63	11.763	.001

Once the master file was reduced to only participants identified as having failed courses for research question two, only 207 unique cases remained. The concern that the data disaggregations from that group may not be of adequate size was realized for the group of students who failed courses and then persisted to completion. The variable F4HHDG listed the highest level of postsecondary education that a participant attained by the fourth follow-up survey. This variable was recoded to variable PSE 2000 for the remainder of the analyses (*Yes* = completed; *No* = did not complete).

The recoding to include associate degrees and certificates as completions was necessary for this study after an initial frequency tabulation revealed only four participants listed as having failed a course went on to complete a bachelor's degree or higher. This in itself is valuable information, albeit merely anecdotal for these four participants (two male and two female). As seen in Table 11, even with the inclusion of the additional postsecondary levels, the variable PSE 2000 included only 58 successful participants. Further disaggregation by gender resulted in even smaller group sizes, seen in Table 13.

As seen previously in tables 2-9, using this more inclusive definition gave mean differences that were smaller. However, all composite variables for the group as a whole and for each gender showed statistical significance at the $\leq .000$ level. With the shift of a group of participants from non-completer status to completer status, the smaller mean differences were expected. Tables 11-16 incorporate the failed course component of the study.

Locus of Control Data for Participants who Failed Courses

The process for analyzing the subset of participants that failed a course to compare

the locus of control variables between completers and non-completers began with case selections. The SPSS software allows a user to analyze variables in a way that tailors the output for the analyses. By selecting the data tab, and then the select-cases option, it was possible to exclude the cases of individuals who had not experienced failing a course from all subsequent analyses. After that exclusion, before introducing gender, the output for the locus of control variables yielded 192 included cases.

The descriptive statistics for this group are reported in Table 11. The higher the score, the more internal control the participant exhibited. Lower scores indicated a more external locus of control. PSE 2000 is the variable that indicates completion (*Yes*) or non-completion (*No*). While this appeared to be an intuitive numerical result, with each of the three variables resulting in lower mean scores for non-completers, it required means-comparison using ANOVA to determine the significance of the numeric differences seen in the descriptive statistics table. Knowing that a higher locus of control score corresponded to increased internal control, it was expected from the literature reviewed that completers (PSE 2000 *Yes*) would have the higher score. The numerical differences, however, considering the group sizes; 137 *No* and 55 *Yes*; must not be concluded to be meaningful without adequate means testing.

The means comparisons include ANOVA tables, which were used in the analyses that were performed to test for differences between the completers and non-completers for all three cluster-variables of locus of control. These data are provided in Table 11. Using the whole group of participants who failed courses produced no significance; thus, the Null hypothesis of no differences between completers and non-completers from this group could not be rejected. None of the tested variables had statistical significance and,

due to the size of the pool after removing non-relevant subjects, these results are not generalizable.

Table 11

ANOVA Results for Locus of Control Composites for Participants Responding to Completion Follow-up Survey Comparing Two Year (Associates) and Higher Completers with Non-completers for Students Who Have Failed Courses

	<u>Completer</u>			<u>Non-completer</u>			F	p
	n	\bar{x}	SD	n	\bar{x}	SD		
Locus Of Control Scores, Composite 1	55	-0.120	0.77	137	-0.223	0.80	0.669	.415
Locus Of Control Scores, Composite 2	55	-0.097	0.63	137	-0.216	0.70	1.200	.275
Locus Of Control Scores, Composite 2 Quartile	55	2.27	1.16	137	2.17	1.14	0.328	.568
Locus Of Control Scores, Composite 1, Females	34	-0.074	0.79	70	-0.227	0.88	0.739	.392
Locus Of Control Scores, Composite 2, Females	34	-0.109	0.68	70	-0.206	0.76	0.399	.529
Locus Of Control Scores, Composite 2 Quartile, Females	34	2.26	1.26	70	2.19	1.20	0.096	.757
Locus Of Control Scores, Composite 1, Males	21	-0.196	0.75	67	-0.219	0.70	0.018	.895
Locus Of Control Scores, Composite 2, Males	21	-0.076	0.56	67	-0.226	0.64	0.922	.340
Locus Of Control Scores, Composite 2 Quartile, Males	21	2.29	1.01	67	2.15	1.09	0.259	.612

The analyses for locus of control incorporated gender. Because this study made no attempt to compare males to females, but instead to determine whether the group as a whole, or either gender individually, showed differences between completers and non-completers, it was necessary to partition the results in this way. The variable F4SEX is the gender category the respondent gave when completing the year 2000 survey. In the case-processing summary for females who have failed a course, who could be included in the locus of control analyses, only six female participants were excluded.

Table 11 provides the descriptive statistics for females. Again, the two groups were small, this time with 70 in the group of non-completers, and only 34 participants in the category of completers. For females only, the numerical differences were greater than for the group as a whole on both composite scores, yet essentially the same for the

quartile assignment. The direction of the numerical difference would seem to show a higher level of internal locus of control for female completers. One interesting finding was that 33% of females completed after failing a course vs. 24% of the males. With the small n it is not generalizable to a larger sample, but for this group of participants it presented an interesting aspect to the data.

Table 11 also shows the ANOVA analyses for females. There were no differences between completers and non-completers that were statistically significant for females. As with the whole group, the numerical differences in means did not translate into statistical significance for any of the locus of control composites, and even the numerical differences were not as great in females as for the group as a whole. The Null hypotheses of no differences could not be rejected for locus of control in females.

The case-processing summary for males who have failed a course showed that there were nine excluded cases, leaving 88 participants to analyze for locus of control. Table 11 provides the descriptive statistics for males. The numerical differences between means for male completers and non-completers were smaller than for females. The size of the group of male completers, unfortunately, was only 21. This small n was unexpected, considering the overall sample for this longitudinal study.

Numerically, the completers would appear to have a higher level of internal locus of control, but again, even with the small n , the ANOVA analyses were performed, and the results are in Table 11. There were no significant differences between groups. The Null hypothesis could not be rejected in males with for locus of control using this subset of the database sample.

Self-Concept Data for Participants who Failed Courses

The NELS database included data attributed to self-concept. The process for analyzing the subset of participants that failed a course to compare the self-concept variables between completers and non-completers began with the same case selections used for the locus of control analyses. After the exclusion of participants who did not fail a course, before introducing gender, the output for the self-concept variables yielded 192 included cases.

Unlike the locus of control variables, the self-concept variables show numerical mean differences that would seem counterintuitive, although not at a magnitude that would be expected to be significant with such a small n and large standard deviation. It had been expected that self-concept would be higher for completers than for non-completers, as in the background data subset before introducing the course failure variable. Table 12 shows the descriptive statistics for the group. With the total n of 55 completers, however, significance was questionable; ANOVA results, as shown in Table 12, demonstrate that fact.

Table 12

ANOVA Results for Self-Concept Composites for Participants Responding to Completion Follow-up Survey Comparing Two Year (Associates) and Higher Completers with Non-completers for Students Who Have Failed Courses

	Completer			Non-completer			F	p
	n	\bar{x}	SD	n	\bar{x}	SD		
Self-Concept Scores, Composite 1	55	-0.151	0.82	137	-0.040	0.74	0.832	.363
Self-Concept Scores, Composite 2	55	-0.133	0.69	137	-0.084	0.64	0.222	.638
Self-Concept Scores, Composite 2 Quartile	55	2.33	1.17	137	2.36	1.08	0.03	.863
Self-Concept Scores, Composite 1, Females	34	-0.155	0.72	70	0.014	0.71	1.276	.261
Self-Concept Scores, Composite 2, Females	34	-0.174	0.69	70	-0.086	0.66	0.402	.527
Self-Concept Scores, Composite 2 Quartile, Females	34	2.24	1.23	70	2.34	1.09	0.205	.652
Self-Concept Scores, Composite 1, Males	21	-0.145	0.97	67	-0.097	0.77	0.054	.817
Self-Concept Scores, Composite 2, Males	21	-0.066	0.71	67	-0.082	0.62	0.01	.922
Self-Concept Scores, Composite 2 Quartile, Males	21	2.48	1.08	67	2.37	1.07	0.148	.702

The self-concept variables were then analyzed for only females using the same methods.

Six female participants were excluded for females who have failed a course in the Table 12 self-concept analysis. Differences for females could be useful for both intervention and future research. As with the group before gender partitioning, the descriptive statistics in Table 12 for female self-concept variables show differences in the counterintuitive direction. However, Table 12 reveals that this difference was not significant through ANOVA analysis.

Next, the subset of males who had failed courses was analyzed in the same way as the previous self-concept analyses for females and for the data before gender partitioning. There were nine cases excluded. Table 12 provides these-data. The magnitude of the mean differences was not as great for males as it was for females, demonstrated by Table 12. As with females-only, the male only ANOVA analyses in Table 12 indicated no

statistical significance between means. Thus, no measure of either locus of control or self-concept in the NELS database provided rejection of the Null hypotheses that of participants who failed courses, there were no differences between completers and non-completers.

Family Composition Data for Participants who Failed Courses

The final measure in this study was an indicator of a social support that influences persistence. Family composition is often cited in the literature (Tinto, 1975, 1993, and 2012) as a factor in educational persistence. As discussed previously, while a more robust measure of social supports, such as the composite locus of control variables provided for that measure, was not available in this database, the family composition composite variables did at least provide a multi-dimensional look at the participants' home lives.

Version one of the composite variables is derived using only base-year data for participants. The parent survey is the source for both versions, but the second version used data collected at the second follow-up. A lower rating corresponds with a traditional family composition, starting with both mother and father in the home as a rating of one. The case processing summary showed 48 excluded cases for the first measure and 17 for the second. Table 13 lists the descriptive statistics for the family composition measure.

The means are numerically different, with completers having a higher composite rating than non-completers do, but the differences are small. Table 13 gives the ANOVA outcomes for family composition. Neither measure demonstrated statistical significance for differences in family composition between completers and non-completers.

Table 13

ANOVA Results for Family Composition Composites for Participants Responding to Completion Follow-up Survey Comparing Four Year (Bachelor's) and Higher Completers with Non-completers for Students Who Have Failed Courses

	<u>Completer</u>			<u>Non-completer</u>			<i>F</i>	<i>p</i>
	<i>n</i>	\bar{x}	<i>SD</i>	<i>n</i>	\bar{x}	<i>SD</i>		
Family Composition Scores, Composite 1	45	2.710	2.03	114	2.530	1.85	0.305	.582
Family Composition Scores, Composite 2	56	3.180	2.06	134	2.920	2.14	0.600	.439
Family Composition Scores, Composite 1, Females	29	2.860	1.94	60	2.430	1.78	1.07	.304
Family Composition Scores, Composite 2, Females	34	3.440	2.18	67	3.000	2.22	0.905	.344
Family Composition Scores, Composite 1, Males	16	2.440	2.22	54	2.630	1.94	0.114	.737
Family Composition Scores, Composite 2, Males	22	2.770	1.85	67	2.840	2.06	0.016	.899

The case processing summary for females-only for the family composition composite variables showed 21 excluded cases for the first measure and nine for the second. Table 13 lists the descriptive statistics for the family composition measure.

The means are numerically different, with female completers having a higher composite one rating than non-completers, but the difference is small. Composite two is essentially the same for both. Table 13 gives the ANOVA outcomes for family composition. Neither measure demonstrated statistical significance for differences in family composition between completers and non-completers.

The case processing summary of males-only for the family composition composite variables showed 27 excluded cases for the first measure and eight for the second. Table 13 lists the descriptive statistics for the family composition measure.

The means are numerically different, with male completers having a lower composite one and two rating than non-completers do, but the differences are small. Table 13 gives the ANOVA outcomes for family composition. Neither measure

demonstrated statistical significance for differences in family composition between completers and non-completers.

In summary, no subsets in this study yielded the statistical significance to reject the Null hypothesis that there was no difference between the groups. The first subset was all participants who had failed a course; the second for female participants who had failed a course; and the third for male participants who had failed a course. These subsets were analyzed for the locus of control measures, the self-concept measures, and for the family composition measure. The analyses were between those in each subset who went on to complete postsecondary programs when compared to those who did not.

It is important to note that the small n of the participants who failed a course, and then the subsequent parsing of this group into even smaller subgroups, is not generalizable. The descriptive statistics are of interest only for nominal differences, even though statistical differences did not exist. This failure to reject the null hypothesis under any of the study analyses prompted the question about participants who did not fail a course, and the way in which that group would differ from the participants who failed a course. Since this was too important to defer for further study, these analyses were subsequently run to supplement the research already conducted.

Locus of Control Data for Participants Who Did Not Fail Courses

Analyses of the group of participants who did not fail courses were expected to involve more participants in the subset of postsecondary completers. Yet, this part of the study clearly demonstrated that the total number of participants with data for course failure is far lower than other variables downloaded from the master database. This field inadequacy was a major factor in all aspects of this investigation. It is not clear why data

for this field would have so many missing or skipped participants. It is even less clear how it is possible that a similar number of participants fall into the course failure or non-course failure groups.

Only 16 participants were excluded from the locus of control composites, leaving 166 participants. Table 14 illustrates that of the 166 participants, there were 75 postsecondary completers: a rate of 45%. The earlier analyses of locus of control data for participants who had failed a course had a rate of 29% (55 postsecondary completers out of 192 who failed courses, from Table 11).

The participants who did not fail a course actually had lower mean scores on the two composite measures of locus of control for the group that completed postsecondary than for those who did not complete. This indicates a lower level of internal Locus of Control. The quartile measure was only slightly higher. As seen in Table 14, this difference for Version 2 was statistically significant at the ≤ 0.05 level for the overall group and for females, but not for males.

Table 14
 ANOVA Results for Locus of Control Composites for Participants Responding to Completion Follow-up Survey
 Comparing Two Year (Associates) and Higher Completers with Non-completers for Students Who Have Not Failed
 Courses

	Completer			Non-completer			F	p
	n	\bar{x}	SD	n	\bar{x}	SD		
Locus Of Control Scores, Composite 1	75	-0.381	0.91	91	-0.197	0.74	2.051	.154
Locus Of Control Scores, Composite 2	75	-0.349	0.78	91	-0.112	0.63	4.696	.032
Locus Of Control Scores, Composite 2 Quartile	75	2.11	1.17	91	2.25	1.10	0.684	.409
Locus Of Control Scores, Composite 1, Females	48	-0.455	0.96	56	-0.212	0.75	2.101	.150
Locus Of Control Scores, Composite 2, Females	48	-0.479	0.84	56	-0.148	0.64	5.195	.025
Locus Of Control Scores, Composite 2 Quartile, Females	48	2.00	1.17	56	2.20	1.14	0.754	.387
Locus Of Control Scores, Composite 1, Males	27	-0.249	0.83	35	-0.173	0.74	0.147	.703
Locus Of Control Scores, Composite 2, Males	27	-0.117	0.61	35	-0.053	0.62	0.165	.686
Locus Of Control Scores, Composite 2 Quartile, Males	27	2.30	1.17	35	2.34	1.06	0.027	.870

Only 10 of the 114 female participants who did not fail a course were excluded from the locus of control analyses. There were 104 total cases included; of these, Table 14 shows there were 48 postsecondary completers. Like the whole group before gender was introduced, the composite locus of control measures for females are seen in Table 14 to be numerically counterintuitive; that is, showing a more external locus of control for completers. The numerical differences for females are larger than for the whole group.

Table 14 provides the ANOVA results for the female participants' locus of control measures. Like the whole group analyses, the difference for the second version of the locus of control composite is statistically significant at the $p \leq 0.05$ level. This allows for rejection of the Null hypothesis that there is no difference between completers and non-completers for locus of control. The greater external control exhibited by completers, however, was unexpected after reading the literature on locus of control and persistence and subsequently analyzing the full database for alignment with the literature

(Tables 2-10). This result will need further study to validate the findings and to determine the true nature of the implications.

The analyses for males showed a smaller number of completers. Of the 68 males shown in Table 14 to be included in the locus of control analyses, only 27 were shown to be postsecondary completers in Table 14. The numerical differences were directionally the same as with the whole group and for females, showing greater external locus of control means for completers. The ANOVA results for males shown in Table 14 indicate no statistical significance and the Null hypothesis would not be rejected.

Self-Concept Data for Participants Who Did Not Fail Courses

Only 16 cases were excluded from the self-concept analyses, and Table 15 shows that, as with the locus of control variables, the self-concept measures included 75 participants who completed postsecondary education. Unlike the locus of control variables, however, the numerical direction of the means comparison shows higher levels of self-concept for completers than for non-completers. As seen in Table 15, these differences were not statistically significant.

Table 15
*ANOVA Results for Self-Concept Composites for Participants Responding to Completion Follow-up Survey
 Comparing Two Year (Associates) and Higher Completers with Non-completers for Students Who Have Not Failed*

	<u>Completer</u>			<u>Non-completer</u>			<i>F</i>	<i>p</i>
	<i>n</i>	\bar{x}	<i>SD</i>	<i>n</i>	\bar{x}	<i>SD</i>		
Self-Concept Scores, Composite 1	75	0.033	0.68	91	0.068	0.81	0.091	.763
Self-Concept Scores, Composite 2	75	-0.035	0.62	91	0.025	0.67	0.363	.548
Self-Concept Scores, Composite 2 Quartile	75	2.45	1.07	91	2.53	1.14	0.184	.668
Self-Concept Scores, Composite 1, Females	48	-0.004	0.70	56	-0.055	0.79	0.119	.731
Self-Concept Scores, Composite 2, Females	48	-0.102	0.60	56	-0.099	0.66	0.000	.985
Self-Concept Scores, Composite 2 Quartile, Females	48	2.38	1.06	56	2.29	1.11	0.174	.677
Self-Concept Scores, Composite 1, Males	27	0.099	0.65	35	0.265	0.82	0.752	.389
Self-Concept Scores, Composite 2, Males	27	0.082	0.64	35	0.224	0.64	0.758	.387
Self-Concept Scores, Composite 2 Quartile, Males	27	2.59	1.08	35	2.91	1.10	1.328	.254

Table 15 also shows that the self-concept measures included 48 female participants who completed postsecondary education. The numerical direction of the means comparison shows higher levels of self-concept for female completers than for non-completers with Composite 1 but not 2, although the quartile measure for Composite 2 is higher. As seen in Table 15, these differences were not statistically significant.

Six cases were excluded from the self-concept analyses, and Table 15 shows that the self-concept measures included only 27 male participants who completed postsecondary education. The numerical direction of the means comparison shows higher levels of self-concept for male non-completers than for completers, and numerically higher means than for females in both the completer and non-completer groups. As seen in Table 15, these differences were not statistically significant.

Family Composition Data for Participants Who Did Not Fail Courses

The final measure in this study was for family composition. Recall that while a more robust measure of social supports was not available in this database (such as the composite locus of control variables provided for that measure), the family composition composite variables did at least provide a multi-dimensional look at a participant's home life. Version one of the composite variables is derived using only base-year data for participants. The parent survey is the source for both versions, but the second version used data collected at the second follow-up. A lower rating is attributed to more traditional family composition, starting with both mother and father in the home as a rating of one.

The case-processing summary showed 40 excluded cases for each measure. Table 16 lists the descriptive statistics for the family composition measure with more than 60 participants in the completers group for both measures. The means are numerically different, and a more traditional family composition translates to a lower mean for completers over non-completers. Table 16 illustrates that this difference has no statistical significance.

Table 16
ANOVA Results for Family Composition Composites for Participants Responding to Completion Follow-up Survey Comparing Two Year (Associates) and Higher Completers with Non-completers for Students Who Have Not Failed

	<u>Completer</u>			<u>Non-completer</u>			<i>F</i>	<i>p</i>
	<i>n</i>	\bar{x}	<i>SD</i>	<i>n</i>	\bar{x}	<i>SD</i>		
Family Composition Scores, Composite 1	62	2.240	1.67	80	2.540	1.74	1.04	.309
Family Composition Scores, Composite 2	61	3.030	2.28	84	3.390	2.33	0.86	.356
Family Composition Scores, Composite 1, Females	40	1.900	1.37	54	2.520	1.68	3.625	.060
Family Composition Scores, Composite 2, Females	37	3.430	2.46	52	3.400	2.43	0.003	.957
Family Composition Scores, Composite 1, Males	22	2.860	1.98	26	2.580	1.90	0.261	.612
Family Composition Scores, Composite 2, Males	24	2.420	1.86	32	3.380	2.21	2.94	.092

For female participants in the family composition analyses, there were 20 exclusions from the first measure and 25 from the second. Table 16 lists 40 female completers for the first variable and 37 for the second. The direction of the numerical differences indicates that a more traditional family composition is associated with completers for the first measure, but not the later. However, the differences in composite means showed no statistical significance for either one.

For male participants in the family composition analyses, there were 20 excluded cases for each measure. Table 16 lists 22 male completers for the first variable and 24 for the second. Table 16 shows that in both the first measure and in the later survey there were no statistically significant differences between the completers and non-completers.

As previously stated, analyses of the group of participants who did not fail courses were expected to involve more participants in the subset of postsecondary completers, yet this part of the study showed that the total number of participants with data for course failure is far lower than other variables downloaded from the master database. This field inadequacy was a major factor in all aspects of this investigation.

CHAPTER FIVE

Discussion

When using persistence prediction models and effect sizes for factor interactions to describe students placed at risk, there remains a need to characterize students who actually failed courses already. In 2010 the NCES publicly released the database for the National Education Longitudinal Study that began in 1988 (NELS: 88/2000), which provided considerable data for analyses, was expected to fill this void. It would inform programs that support postsecondary persistence to graduation, an area of concern for many stakeholders. Students, parents, college administrators, taxpayers, and businesses who need highly qualified employees all feel the effects of college persistence levels.

It is just as disadvantageous to burden a student with excessive college loan debt with no program completion as it is to fund grants for students who do not complete. Beyond the economic impact, there are other consequences of completion or non-completion, although some are less quantifiable than resource consumption. Considering the expense of higher education and the societal cost to everyone involved, when students do not complete, stakeholders have a collective interest in promoting persistence to degree completion.

Student success in higher education is typically measured as persistence to completion of a degree or certificate program. This study initially focused on students who experienced failing grades early yet persisted to the completion of a degree program within eight years. The choice of the 8-year data point was based on the Integrated Postsecondary Education Data System (IPEDS) federal reporting requirement to track graduation rates at 4, 5, 6, and 8 years.

Predicting persistence is examined extensively in the literature. However, research on students who have already failed courses and then persisted to completion has been sparse. Within the category of students exhibiting the very thing that the models purport to predict, failing courses, it was useful to compare students from this group who subsequently persisted to completion with those who did not. Comparing these two outcomes for students by analyzing data indicating levels of characteristics related to Locus of Control, Self-Concept, and Social Supports was planned to generate actionable data that could assist decision makers in higher education.

Identifying risk factors, such as those in Tinto's original model (1975), can help predict who will choose to leave college. However, to optimize resources for the common goal of student success, research is still needed beyond models using only group membership indicators. Studying the students who have not successfully completed coursework to find commonalities expands our knowledge base in this area.

Julian B. Rotter described the theory of locus of control in his original monograph, which identified the construct as control of reinforcement (Rotter, 1966). The Rotter Internal External Scale of Locus of Control (see Attachment I) measures the degree that a person believes an event to be "contingent upon his own behavior or his own relatively permanent characteristics" --internal control-- or "controlled by forces outside himself and may occur independently of his actions" --external control (Rotter, 1966, p. 1). This is an important concept in the study of resilience for areas as diverse as education, parenting, and even career and prison studies.

Self-concept can be defined broadly as a person's perception of himself. This perception can influence one's actions, but one's actions can also influence self-concept

(Shavelson, Hubner & Stanton, 1976). This provides a challenging construct to measure. Shavelson, et al. proposed a hierarchical model of self-concept that starts with the idea of general self-concept which is comprised of academic and non-academic self-concept. The academic self-concept can be further broken down into specific subjects and the non-academic into social, emotional or physical self-concept. There are additional component dimensions and these subareas of self-concept include behaviors in specific situations which can be evaluated. This study looks at self-concept in general as it applies to persistence.

Research shows that social supports can also promote resilience in students (Pascarella, Terenzini & Wolfe, 1985, Pascarella & Terenzini, 2005, Cabrera, 1992, Tinto, 1975, 1993, and 2012). These supports can be advisors, tutors, peers, faculty, clergy, or family. Social supports at the institution level can be costly to provide and are often the focus of cutbacks in bad economic times. This study generates actionable knowledge in these areas for the most effective scaffolding of the vulnerable students who have experienced failing grades at the beginning of their postsecondary experience.

The NCES dataset from IPEDS confirms that, in the United States, more women than men complete college (U. S. Department of Education). This dataset also shows that the gender gap is growing. Franke, Hurtado, Pryor, and Tran (2011) used this dataset in a compilation for the Higher Education Research Institute at the University of California Los Angeles (UCLA). The report notes the narrowing of the gender gap from 4-year completion rates to 5- and 6-year rates and posits that factors such as the longer program majors men choose could be impacting time to completion.

The analyses for research questions one and two on the database for completers vs. non-completers of attempted postsecondary education programs bore out the implications from the literature review for this study. These analyses were originally only performed using a strict definition of persistence to completion. Of the subset of students who entered postsecondary education, only those who completed a bachelor's degree or higher were considered to be completers. With $p \leq .000$ significance for all three resilience factors in not only the overall group, but for each separate gender partition, the data supported rejecting the Null hypotheses across the board. These analyses established the relationship between persistence and the risk factors in the study, Locus of Control, Self-Concept, and Family Composition from the sample for students with completion data for research questions one and two.

These relationships also existed when the definition for completion included students with two-year or greater program completion. The mean differences were smaller, yet once again, all composite variables for each of the three factors in the study showed statistical significance at the $\leq .000$ level for the group as a whole and for each gender. With the shift of a group of participants from non-completer status to completer status, the smaller mean differences were expected. With such a large sample, this finding lends considerable support to the study in general, and for further exploration of these risk factors specifically. The risk factor analyses for research questions one and two demonstrated a relationship between a successful persistence outcome and greater internal locus of control, traditional family composition, and more positive self-concept.

It was subsequently necessary to further diminish the subset of the database that had only included participants who had attempted postsecondary education to test

hypotheses three and four for this study. Once this first subset from the master file was reduced to only participants identified as having failed courses, there remained only 207 unique cases. This meant even fewer participants for inclusion than the worst-case scenario considered at the outset. Thus, initial concern that the data disaggregations for the proposed research questions may not be of adequate size was fully realized for the group of students who failed courses and then persisted to completion. It is not clear why data for this field would have so many missing or skipped participants. It is even less clear how it is possible that a similar number of participants fall into the course failure or non-course failure groups.

The variable F4HHDG listed the highest level of postsecondary education that a participant attained by the fourth follow-up survey for those who entered postsecondary programs. This variable was initially recoded to variable PSE 2000 for the aforementioned background analyses using bachelor's degree attainment or better (Yes = completed, No = did not complete). An exploratory frequency tabulation using this original recoding on the subset of 207 cases revealed only four participants who attempted postsecondary education, failed a course, and then went on to complete a bachelor's degree or higher. Of course, this in itself is valuable information, albeit merely anecdotal for these four participants, two males and two females.

This led to modifications that could still yield valuable results for the intent of this study, as well as additional analyses performed along the way, for a deeper look into the data beyond the original hypotheses and methods. Subsequently, an alteration to the F4HHDG variable recoding to include associate degrees and certificates as completions was used for the remainder of this study. Even with the inclusion of the additional levels

of postsecondary education, the variable PSE 2000 consisted of only 58 successful completers in the group of participants who attempted postsecondary education and failed courses. Further disaggregation by gender resulted in even smaller group sizes.

However, even using the revised definition of completer for students who have failed courses but persisted to completion in postsecondary education, there were no statistically significant differences from participants who have failed courses but did not persist to completion. This was true for locus of control, self-concept, and family composition. Thus, the Null hypotheses could not be rejected in any category or for any version of these composites in the study for that group. This result prompted the question about what the results would have been for students who did not fail courses. Because this seemed too important to defer for future study, it was necessary to download and analyze the data in the same way for students who attempted postsecondary education without course failure. These additional analyses demonstrated that the constraining variable was actually the small number of cases of verified course failure or non-failure in this database.

Had the Null hypothesis been proffered for the students who did not fail courses, it would also not be rejected for all but version 2 of the Locus of Control composite variable for the overall group and for females. However, the directional mean differences were counterintuitive, in that a higher Locus of Control score corresponds to a higher Internal Locus of Control. Yet, the means in the two Null hypotheses that were rejected indicated lower scores for completers than non-completers.

This was an important finding after seeing numerically higher scores for Locus of Control when the students who had failed a course and then completed were compared to

non-completers. The Null hypotheses could not be rejected for the participants who experienced course failure, revealing another avenue for further study: looking at the two subsets for course failure to determine the viability of demonstrating significance with another data collection.

None of the self-concept or family composition variables for the whole group or either gender rejected the Null hypotheses for those measures. The unexpectedly small n for the gender subsets in the group who did not fail courses led this research in yet another direction. The temptation to include an addition to this research, or at least an investigation into another possible option, led to consideration of other longitudinal data sources.

Due to the length of time since the last update to the NELS: 88 database, which was released to the public in 2010, the idea of looking at a newer survey database was added to the original IRB for this project. Additional data from The Education Longitudinal Study of 2002 (ELS: 2002/2012), a newer version of the National Education Longitudinal Study of 1988 (NELS: 88), was made publicly available during the course of this research in 2014 on the NCES website. The prospect that it could validate the findings in the original database showed initial promise, a shortened timeframe and fewer intervals notwithstanding.

Once the IRB approval to include this additional database was granted, it was possible to evaluate the variables of the ELS: 2002/2012 database for matching data to reproduce the study with the newer data. Unfortunately, the alignment of survey questions and composites is inadequate for this endeavor. None of the locus of control or self-concept variables or composites is included in ELS: 2002/2012. The one composite

variable of the hypotheses for this study that is available in the newer database is the family composition composite.

In retrospect, the choice to include family composition as the indicator of social support for the NELS: 88 analyses was not adequately supported in the literature to satisfactorily represent the social supports factor. Using that composite variable as the sole measure of social supports is not established in the research, as it is shown to be only one of many indicators of social supports that affect persistence. A large body of research in the field of social supports indicates interaction among many aspects of social support to have a positive or negative effect. Early studies of this interaction by Tinto (1975) and Bean (1985) have been validated by others, such as Pascarella and Chapman (1983), Pascarella and Terenzini (2005), Jones (2010), and even Tinto's own subsequent work (1993, 2012, 2017).

One major implication of this study is the need for further research to identify course failure in postsecondary education, determine the participants' levels of locus of control self-concept and social supports, and then collect longitudinal data on that group for persistence to completion in postsecondary programs. While the two databases included in the IRB for this study were inadequate to draw conclusions of the nature anticipated, the data revealed other information about the participants that could lead to further research in this area.

The locus of control composite for NELS: 88 was a robust measure. It was the strongest data composite of the study, yet the conclusion that must be stated is that for none of the subset groups hypothesized could the Null hypothesis be rejected for research questions three and four. No differences can be shown between completers and non-

completers, whether male, female, or as a whole, for students who failed courses. Even after the decision to analyze the data for participants who did not fail courses was made, only the second of the three versions of this composite variable yielded rejection of the Null hypotheses, and that was in a counterintuitive direction yielding significance of a lower Internal Locus of Control for females and the overall group. While disappointing, it must be clearly stated that this is only one study and included only one database. It does not warrant a wholesale dismissal of further research using other sources of data.

For all three levels of analysis, the whole group, females and males, the small n for the completers must be considered as a possible source of a TYPE II error. In a database with more substantial representation for the completers, these analyses may have yielded a different result and the Null hypothesis may have been rejected. If, however, the analyses are repeatable for other samples, it would mean that the locus of control factor is, indeed, not significantly different between students who have failed courses, yet persist to graduation, and those who do not.

The actionable data in the results for Locus of Control came in the form of gender differences, although not specifically for participants with course failure data. When completions were disregarded as the bachelor's degree or higher recode version, gender differences were significant for the three composite Locus of Control variables. For the certificate plus recode, the completers differences between genders were statistically significant at the $\leq .000$ level for all three composites. These findings are ripe with potential for further study.

The self-concept composite variables also provided promise for further study. Males scored higher for positive self-concept. When program completion was

disregarded as the bachelor's degree or higher recode version; gender differences were significant for the three composite Self-Concept variables. For the certificate plus recode, the differences between genders were statistically significant at the $\leq .000$ level for all three composites. Findings this pervasive when using such a large database have implications beyond the scope of this study.

As expected with composite variables for family composition, this less robust measure yielded only modest information once the study went beyond research question one and two analyses. Data show that the males had more traditional family composition means, and for the second survey that included the measure (F2), that difference was significant at the $\leq .01$ level. Mean differences by gender for the first survey that included the measure (F1) were not significant.

In addition to the variables examined here, other variables such as self-efficacy, anxiety, depression, and "grit" (the idea that passion and perseverance are inter-related and explain persistence to graduation (see Duckworth, 2016)) are interesting for future research. Grit is malleable. In fact, the research shows that age is a factor in grit (Duckworth 2016, Hwang, Lim, & Ha 2018). This could mean that different generations had different influences on grit or could show that grittiness increases with age or maturity. Either would have implications for further study on grit and completions.

Self-efficacy is another valuable area for further study. Self-efficacy beliefs influence student performance by either bolstering or undermining one's efforts. Bandura defines Perceived Self-Efficacy as "people's beliefs about their capabilities to produce effects" (Bandura, 1994, p. 71). He further states: "Self-efficacy beliefs determine how people feel, think, motivate themselves [*sic*] and behave." Self-efficacy

studies relating to student performance are valuable in the field of resilience for the insight they provide into protective factor mechanisms. Bandura (1986) believed that self-concept and self-efficacy described different concepts, but Pajares and Miller described the difference as one of context, with self-efficacy as a “context-specific assessment of competence to perform a specific task,” (1994, p. 194) and self-concept as a broader measure.

Research shows that self-efficacy relates to academic performance. The study by Han, Farruggia and Moss (2017) on 1,400 college students from a large public university indicated that self-efficacy, as measured by the Course Efficacy subscale, is closely associated with academic performance using first semester GPA ($p < .001$). This study also showed that self-efficacy is closely associated with academic motivation ($p < .001$).

The Self-Concept results in this study uncovered an area for further research using additional measures. Self-concept is one of the traits that research has also shown to be malleable (Cairns, et al., 1990). Hence, these results may indicate that a viable opportunity for one or more interventions in this area could be developed with pre- and post- measures to determine their effectiveness.

There is also a need to improve completion rates. Perhaps future research with implications specifically for males or for females could identify a better source of interventions. Finding interventions for one gender and applying them in the same way or with slight modification for the other gender has been point of contention among educators for decades.

Another possibility for further research is to conduct a qualitative study on failed course completers. When the numbers are too small for a definitive quantitative study,

much can be gleaned with an in depth look at the individuals that display the characteristics of interest to the researcher. Ideally, adequate data for mixed methods research would provide actionable study outcomes.

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Appendix A

Composite Variable Technical Detail

“TEEN LOCUS OF CONTROL”/”TEEN SELF-CONCEPT” Composite variable descriptions are as follows:

The teen locus of control composite of three locus of control items in the second follow-up student and dropout questionnaires designed to be as comparable as possible to HS&B and NLS-72 data.

Note: This variable was constructed in a previous wave using the appropriate statistical weight and sample for that wave. Base year, first follow-up, and second follow-up weights and full samples for each wave are included in the BY-F2 ECBs and datafiles.

/*-----*/

/* Create composite F2LOCUS1 using F2S66A-M or F2D57A-M. */

/* Create F2 Locus of Control and Self Concept variables

F2LOCUS1, F2LOCUS2, F2CNCPT1, F2CNCPT2, F2LOCU2Q and F2CNCPT2Q using F2S66A-M or F2D57A-M. */

/* Begin by creating working variables Q66A-M by assigning them the values of F2S66A-M if they exist, otherwise assigning them the values of F2D57A-M. */

IF F2QFLG=1 THEN DO;

Q66A=F2S66A; Q66B=F2S66B; Q66C=F2S66C; Q66D=F2S66D; Q66E=F2S66E;

Q66F=F2S66F; Q66G=F2S66G; Q66H=F2S66H; Q66I=F2S66I; Q66J=F2S66J;

Q66K=F2S66K; Q66L=F2S66L; Q66M=F2S66M;

END;

ELSE IF F2QFLG=2 THEN DO;

```

Q66A=F2D57A; Q66B=F2D57B; Q66C=F2D57C; Q66D=F2D57D; Q66E=F2D57E;
Q66F=F2D57F; Q66G=F2D57G; Q66H=F2D57H; Q66I=F2D57I; Q66J=F2D57J;
Q66K=F2D57K; Q66L=F2D57L; Q66M=F2D57M;
END;

```

```

/* Recoded variables are created with values in the reverse order for "positive" questions
so low to high values will reflect same dimensions as other questions. Variables are set to
missing if
not a value 1-4. */

```

```

ARRAY Q66ADEHK Q66A Q66D Q66E Q66H Q66K; /* Original values */
ARRAY R66ADEHK RQ66A RQ66D RQ66E RQ66H RQ66K; /* Recoded values */
DO OVER Q66ADEHK;
IF Q66ADEHK = 1 THEN R66ADEHK = 4;
ELSE IF Q66ADEHK = 2 THEN R66ADEHK = 3;
ELSE IF Q66ADEHK = 3 THEN R66ADEHK = 2;
ELSE IF Q66ADEHK = 4 THEN R66ADEHK = 1;
ELSE R66ADEHK =.;
END;

```

```

/* Recoded variables are created for the remaining questions that did not need to be
reversed. Variables are set to missing if not a value 1-4. */

```

```

ARRAY Q66REST Q66B Q66C Q66F Q66G Q66I Q66J Q66L Q66M;
ARRAY R66REST RQ66B RQ66C RQ66F RQ66G RQ66I RQ66J RQ66L RQ66M;
DO OVER Q66REST;
IF Q66REST >= 1 AND Q66REST <= 4 THEN R66REST = Q66REST;

```

```
ELSE R66REST = .;
```

```
END;
```

```
/* The following SAS procedure (PROC STANDARD) reads in the new variables  
(RQ66A-M) and creates standardized values ("Z-scores") weighted by F2QWT. Values  
for each variable will
```

```
have a mean of zero and standard deviation of 1. */
```

```
PROC STANDARD OUT = Q66STAND MEAN = 0 STD = 1 VARDEF = WEIGHT;
```

```
WEIGHT F2QWT;
```

```
VAR RQ66A RQ66B RQ66C RQ66D RQ66E RQ66F RQ66G RQ66H RQ66I RQ66J  
RQ66K
```

```
RQ66L RQ66M;
```

```
/* A new file is created with new Concept and Locus variables */
```

```
DATA PSYCH (KEEP = STU_ID F2LOCUS1 F2LOCUS2 F2CNCPT1 F2CNCPT2  
F2LOCU2Q
```

```
F2CNCPT2Q LOCUS1 LOCUS2 CNCPT1 CNCPT2 F2QWT);
```

```
SET Q66STAND; /* Use data that were output from PROC STANDARD */
```

```
/* For each of the Locus and Concept variables, take the mean of the selected  
standardized variables, multiply by 100, then round to the nearest integer. If the result is  
missing, set the
```

```
result equal to "9998". */
```

```
F2LOCUS1 = ROUND(MEAN(RQ66C, RQ66F, RQ66G)*100);
```

```
IF F2LOCUS1 = . THEN F2LOCUS1 = 9998;
```

F2LOCUS2 = ROUND(MEAN(RQ66B, RQ66C, RQ66F, RQ66G, RQ66K,
RQ66M)*100);

IF F2LOCUS2 = . THEN F2LOCUS2 = 9998;

F2CNCPT1 = ROUND(MEAN(RQ66A, RQ66D, RQ66E, RQ66H)*100);

IF F2CNCPT1 = . THEN F2CNCPT1 = 9998;

F2CNCPT2 = ROUND(MEAN(RQ66A, RQ66D, RQ66E, RQ66H, RQ66I, RQ66J,
RQ66L)*100);

IF F2CNCPT2 = . THEN F2CNCPT2 = 9998;

/* Set up unrounded means corresponding to locus and concept variables created above
from which to calculate quartile variables F2LOCU2Q and F2CNCPT2Q. */

LOCUS1 = (MEAN(RQ66C, RQ66F, RQ66G))*100;

LOCUS2 = (MEAN(RQ66B, RQ66C, RQ66F, RQ66G, RQ66K, RQ66M))*100;

CNCPT1 = (MEAN(RQ66A, RQ66D, RQ66E, RQ66H))*100;

CNCPT2 = (MEAN(RQ66A, RQ66D, RQ66E, RQ66H, RQ66I, RQ66J, RQ66L))*100;

/* If the sum is missing, the quartile variable is set to 8 (missing), otherwise the one-
fourth break points are used to determine quartile value. */

IF LOCUS2 = . THEN F2LOCU2Q = 8;

ELSE IF LOCUS2 <= -39.51 THEN F2LOCU2Q = 1;

ELSE IF LOCUS2 <= 4.11 THEN F2LOCU2Q = 2;

ELSE IF LOCUS2 <= 46.63 THEN F2LOCU2Q = 3;

ELSE F2LOCU2Q = 4;

IF CNCPT2 = . THEN F2CNCPT2Q = 8;

ELSE IF CNCPT2 <= -42.35 THEN F2CNCPT2Q = 1;

ELSE IF CNCPT2 <= -3.80 THEN F2CNCP2Q = 2;

ELSE IF CNCPT2 <= 50.29 THEN F2CNCP2Q = 3;

ELSE F2CNCP2Q = 4;

Sources: NELS: 88/1994 public-use ECB

At the first follow-up, and again at the second follow-up, a cluster was used to create a composite variable for family composition. The technical information describing the cluster score derivations for family composition is as follows:

FAMILY COMPOSITION composite variables

Name F2FCMP/Label F2/FAMILY COMPOSITION

Section F2 Parent Pub/Type Composite

Description:

Indicates the family or household composition, and is based entirely on second follow-up parent questionnaire items F2P8A-F.

+/*-----*/

/* Create composite F2FCMP using F2P8A-H, F2P2, and F2P3. If any variables F2P8A-F equal yes (1), assign related values to F2FCMP based on their combination. */

IF F2P8A = 1 AND F2P8D = 1 THEN F2FCMP = 01; /* Mom and Dad */

ELSE IF F2P8D = 1 AND (F2P8B = 1 OR F2P8C = 1)

THEN F2FCMP = 02; /* Mom and male guardian */

ELSE IF F2P8A = 1 AND (F2P8E = 1 OR F2P8F = 1)

THEN F2FCMP = 03; /* Dad and female guardian */

ELSE IF (F2P8B = 1 OR F2P8C = 1) AND (F2P8E = 1 OR F2P8F = 1)

THEN F2FCMP = 04; /* Other female and male relatives */

```

ELSE IF F2P8D = 1 OR F2P8E = 1 OR F2P8F = 1
THEN F2FCMP = 05; /* Adult female */

ELSE IF F2P8A = 1 OR F2P8B = 1 OR F2P8C = 1
THEN F2FCMP = 06; /* Adult male */

/* Otherwise if none of the variables F2P8A-F is equal to 1 and:
a) F2P2 is 4 and F2P3 is 1, 5, or 7-9 or
b) F2P2 is 8 and F2P3 is 7 or 8 and either F2P8G or H is 1
then F2FCMP is set to 7. Otherwise F2FCMP is set to missing. */

ELSE IF F2P8A NE 1 AND F2P8B NE 1 AND F2P8C NE 1 AND
F2P8D NE 1 AND F2P8E NE 1 AND F2P8F NE 1 AND
((F2P2 = 4 AND F2P3 IN (01, 07, 08, 09, 05)) OR
(F2P2 = 8 AND (F2P3 = 07 OR F2P3 = 08) AND
(F2P8G = 1 OR F2P8H = 1)))
THEN F2FCMP = 07;

ELSE F2FCMP = 98; /* Missing */

```

Sources: NELS: 88/1994 public-use ECB

Name F2F1FCMP/Label F1 FAMILY COMPOSITION

Section F2 Parent Pub/Type Composite

Description:

Indicates the family or household composition and is based entirely on base-year parent questionnaire data. It is derived from question 1 in the base-year parent questionnaire (BYP1A1, BYP1A2) and indicates the adult composition of the sample member's household as of the base

year.

Sources: NELS: 88/1994 public-use ECB