TRANSFER TRANSITIONS: PREDICTIVE MODELS OF ENTERING TRANSFER STUDENT ACADEMIC SUCCESS AT BALL STATE UNIVERSITY

A THESIS

SUBMITTED TO THE GRADUATE SCHOOL

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE

MASTER OF ARTS

IN STUDENT AFFAIRS ADMINISTRATION IN HIGHER EDUCATION

BY

CHARLES RAYMOND CLAUSEN

DR. ROGER WESSEL - ADVISOR

BALL STATE UNIVERSITY

MUNCIE, INDIANA

MAY 2014

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Committee Approval:

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Dr. Roger Wessel, Committee Chairperson Date

_____

Dr. Alan Hargrave, Committee Member Date

_____

Dr. William Knight, Committee Member Date

Departmental Approval:

_____

Dr. Jayne Beilke, Departmental Chairperson Date

Graduate School Approval:

_____

Dr. Robert Morris, Dean of Graduate School Date

BALL STATE UNIVERSITY

MUNCIE, INDIANA

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ABSTRACT

THESIS TITLE: Transfer Transitions: Predictive Models of Entering Transfer Student Academic Success at Ball State University

STUDENT: Charles Raymond Clausen

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Tinto's (1993) Theory of Individual Departure from Institutions of Higher Education conceptualized the decision making process students navigate when committing to institutions of higher education and persisting to graduation. Transfer students are gaining the attention of administrators and policy-makers because of the high level of transfer activity in higher education. Many of these students face a uniquely difficult transition when moving from one institutional environment to another. The phenomenon, known as transfer shock, is the overall integration and adaptation difficultly that transfer students face (Hills, 1965). Since previous institution cumulative grade point average (GPA) is a criterion used in transfer admissions decisions, it was studied. Six-year graduation totals were also observed in the study because they indicates student commitment to their institution and goals toward graduation.

The purpose of this study was to examine Ball State University entering transfer students and how to predict post-transfer GPA and six-year graduation based on previous institution cumulative grade point average, age, sex, previous institution type, and BSU college. Regression analysis was used to make predictive models for post-transfer GPA and six-year graduation using the observed variables (i.e., previous institution cumulative GPA, age, sex, previous

institution type, and BSU college). The sample consisted of 1,857 entering transfer students at Ball State University, a state-assisted, residential university with high research activity in Muncie, Indiana.

Previous institution cumulative GPA averaged 2.994 while the average post-transfer GPA was 1.681. Nearly 60% of the sample achieved six-year graduation. The results of the revised model for predicting post-transfer GPA found only previous institution cumulative GPA, age, previous institution type, and whether or not the student was in CAST to be statistically significant predictors. The model used to predict six-year graduation found previous institution type, age, sex, previous institution type, and three of the BSU colleges (CAST, CCIM, and TC) to be statistically significant predictors. When applied to the data, the six-year graduation prediction model correctly predicted six-year graduation at a rate of 79.6% and had an overall correct prediction percentage of 63.6% of the time. Suggestions for practice and recommendations for future research were included.

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CHAPTER ONE: INTRODUCTION

Introduction to the Study

Chapter one delivers an introduction to the study which examined Ball State University (BSU) entering transfer students and how demographic characteristics predict academic success. The purpose of the study, research questions, hypotheses, setting, significance of the study, definitions of terms, and organization of the study are included in this chapter.

Different facets of integration, academic and social specifically, influence a student's commitment to an institution (Tinto, 1975, 1993). Tinto's (1993) Theory of Individual Departure from Institutions of Higher Education conceptualized the decision making process students navigate when committing to institutions of higher education and persisting to graduation. Background demographic characteristics were a part of the model because of their influence on students clarifying their personal goals. Personal goals in turn are the foundation of students' expectations when they interact with an institution's environment. Students become integrated at different levels. Those who academically and socially integrate most often persist, earn sufficient grade point averages, and graduate. Those who insufficiently integrate, most often drop out, are dismissed, or transfer.

Transfer students are gaining the attention of administrators and policy-makers because of the high level of transfer activity in higher education. Many of these students face a uniquely difficult transition when moving from one institutional environment to another. The phenomenon, known as transfer shock, is the overall integration and adaptation difficultly that transfer students face (Hills, 1965). Socially, transfer students are often apprehensive because they are moving to a new environment (Gawley & McGowan, 2006). New institutions can have more fitting communities, opportunities to get involved, and different classroom dynamics which

better meet the needs of students. Academically, transfer students can have difficulty adjusting to new teaching styles, grading expectations, and levels of time and effort required to succeed. Previous research supported the idea of transfer shock in an academic sense because results have shown transfer students experience a decrease in grade point average (Gawley & McGowan, 2006; Ishitani, 2008).

Since previous institution cumulative grade point average (GPA) is a criterion used in transfer admissions decisions, it is often studied (Laanan, 2001). GPA is also a commonly used and understood measure of academic success. While studying GPA is not a new concept, it provides tangible insight to student academic integration which often influences persistence; thus, it was examined. Six-year graduation totals were also observed in the study because they indicate student commitment to their institution and goals toward graduation. Graduation totals are becoming of increasing interest to policy-makers who want to ensure public funds are being efficiently used (Kinnick et al., 1998). Because the focus on transfer students is primarily academic, this study concentrates on academic integration.

Although the demographic characteristics of transfer students in this study (i.e., previous institution cumulative GPA, age, sex, previous institution type, and BSU college) have occasionally been examined before, results have varied. Continued investigation is needed to see how this particular combination of demographic characteristics provide accurate prediction models of post-transfer GPA and six-year graduation. With this information, at-risk students could be more easily identified before admittance or offered more assistance upon arrival to campus.

Purpose of the Study

The purpose of this study was to examine Ball State University entering transfer students and how to predict post-transfer GPA and six-year graduation based on previous institution cumulative grade point average, age, sex, previous institution type, and BSU college.

Research Questions

The following research questions were asked in this study:

1) Among Ball State University entering transfer students, which of the observed demographic characteristics (i.e., previous institution cumulative GPA, age, sex, previous institution type, and BSU college) are statistically significant predictors of post-transfer GPA?
2) Among Ball State University entering transfer students, which of the observed demographic characteristics (i.e., previous institution cumulative GPA, age, sex, previous institution type, and BSU college) are statistically significant predictors of six-year graduation?

Hypotheses

The following hypotheses were tested in this study:

1) Previous institution cumulative grade point average, age, sex, previous institution type, and BSU college are statistically significant predictors of post-transfer GPA.
2) Previous institution cumulative grade point average, age, sex, previous institution type, and BSU college are statistically significant predictors of six-year graduation.

Setting

Ball State University (BSU), the setting of this study, is located in Muncie, Indiana, and is ranked as a research university with high research activity by the Carnegie Foundation for the Advancement of Teaching (Ball State University, 2013a). This state-assisted, residential

university had an enrollment of 21,053 undergraduate and graduate students in the fall 2013 semester. The university has seven academic colleges and offers seven associate degrees, 178 bachelor degrees, 99 masters degrees, two specialist degrees, and 17 doctoral degrees (Ball State University, 2013b). On average in the last six years, slightly fewer than 800 students per year have transferred to BSU, the undergraduate population has had a slight majority of women, and 10% of undergraduate students were over 25 years old (Ball State University, 2013c). Four-year institutions provided 47% of transfer students, whereas 43% were from two-year institutions. The remaining 10% of transfer students were missing previous institution data. The College of Sciences and Humanities accounted for 31% of undergraduate students; the rest were enrolled in the College of Applied Sciences and Technology (18%), Miller College of Business (13%), College of Communication, Information, and Media (13%), College of Fine Arts (7%), Teachers College (7%), College of Architecture and Planning (3%), and no specific college with interdepartmental, undecided, or general studies majors (7%).

The researcher is a student in the Student Affairs Administration in Higher Education Master of Arts program and Graduate Assistant in the Office of Housing and Residence Life. He is also involved in the development and implementation of a residential living-learning community for transfer students.

Significance of the Study

The transition into a new college environment and system can be difficult for transfer students. Academic and social integration levels are pivotal in students' decision to persist and ability to achieve their goals (Tinto, 1975). Many studies have analyzed how different demographic characteristics predict GPA or graduation. Few studies, however, attempted to predict both GPA and six-year graduation from the set of characteristics given in this study (i.e.,

previous institution cumulative grade point average, age, sex, previous institution type, and BSU college). Furthermore, this study examined several years of BSU entering transfer students in an attempt to see if patterns reported by the literature can be generalized to all BSU entering transfer students. Results of this study will help university administrators identify at-risk transfer students early on and call for an examination of the university's transfer admission practices. Identifying demographic characteristics which cause differences in GPA and graduation will help do these things. When these are understood, better services and learning opportunities could be provided to students to help them achieve academic, social, and vocational goals.

Definition of Terms

The following terms are defined for this study.

BSU College – The academic college housing the student's academic major.

Grade Point Average – A commonly used quantitative representation a student's academic ability measured on a continuous scale from zero to four.

Graduation – Successful completion of a bachelor's degree program.

Horizontal Transfer – Students transferring between four-year institutions (McCormick & Carroll, 1997).

Entering Transfer Students – Transfer students enrolled in their first semester at their new institution.

Native Students – Students enrolled in their first and only institution (Hills, 1965).

Previous Institution Cumulative Grade Point Average – The commonly used quantitative representation of a student's academic ability measured on a continuous scale from zero to four at their pre-transfer institution.

Post-Transfer Grade Point Average – The commonly used quantitative representation of a student's academic ability measured on a continuous scale from zero to four after the first year of enrollment at Ball State University.

Transfer Shock – The all-encompassing difficulty of transitional issues a transfer student faces when adapting to a new institution's academic and social environment (Hills, 1965).

Vertical Transfer – Students transferring from a two-year to a four-year institution (McCormick & Carroll, 1997).

Organization of the Study

This study is arranged in a five chapter format. This introductory chapter presents the major ideas of the study. Chapter two is a literature review and focuses on the persistence tendencies of transfer students and the demographics which influence their ability to academically succeed. A framework of the methodology is included in chapter three. Chapter four reports the findings of the study. Chapter five provides a discussion of the results, suggestions for practice, limitations, and recommendations for future research. Following chapter five, references and an appendix are included.

CHAPTER TWO: LITERATURE REVIEW

Summary of the Study

This study analyzed factors which predict post-transfer grade point average (GPA) and six-year graduation for entering transfer students at Ball State University (BSU). Understanding the influence of these characteristics may assist enrollment administrators when making admittance decisions. It may also aid university administrators and educators in providing effective programs and support services to help at-risk students achieve academic, social, vocational, and life goals. This research is presented in a five-chapter format. Chapter two reviews the literature.

This review of literature is provided to help the reader understand previous research on the academic success implications of when undergraduate students transfer to a different institution. Furthermore, the concept of transfer shock is explored specifically as it relates to academic performance measures. The review concentrates on the literature regarding the characteristics observed in this study.

Theoretical Framework

Vincent Tinto's (1993) Theory of Individual Departure from Institutions of Higher Education suggested how different facets of integration influence a student's commitment to an institution. Tinto began this work when there were insufficient classifications of why students dropped out. All students who voluntarily withdrew, were academically dismissed, or transferred, were classified together as dropouts. This insufficient understanding and description of dropout behavior caused confusion regarding persistence to graduation. Aside from the issue of insufficient classification, dropout research also lacked a conceptual model of how the process unfolded. Further, any efforts to explain departure were based on insufficient models of

educational persistence. At the time, these models assumed departing was the result of some personal failure or inadequacy.

Along with psychological models of educational persistence, economic and organization models were used (Tinto, 1993). Limiting prediction of educational persistence to psychological models is problematic because students' psychological states are only a small portion of the process by which the decision to persist or depart is made. Economic models also fall short of encompassing everything that influences a student's decision. Though it is agreed students use a cost-benefit analysis of their education, this still is only another piece of the puzzle. Lastly, organizational theories suggest the organization (institutions of higher education in these instances) also play a role in the decision to persist or not. A truly sufficient model must account for individual psychological, economic, and organizational influences.

Persisting through college was viewed as similar to transitioning through rites of passage (Tinto, 1993). Van Gennep's (1960) study of rites of passage yielded a process of three stages: separation, transition, and incorporation. Tinto's (1993) application to higher educational persistence included separation of communities from the past, transition between high school and college, and incorporation into the society or environment of the college. Separation of communities from the past can include varying levels of students' disassociation from their high schools, friends, and family. While these disassociations are happening, students transition between high school and college. This leaves them potentially vulnerable to stress and isolation since they may not have acquired the social and academic skills needed to be successful. Though the first two stages are stressful, they alone do not lead to departure. The decision to depart or not lies with the students. They must react and respond to their changing environment. After separation and transition have taken place, students begin to incorporate themselves into

the society of the college. Students begin to develop the skills they will need to succeed in college. They also become a part of the society of the college by engaging in classrooms, student organizations and activities, etc.

Building off Spady's (1970) application of Durkheim's (1961) theory of suicide to dropout, Tinto (1993) continued to develop his Theory of Individual Departure from Institutions of Higher Education. Durkheim (1961) suggested that suicide happens more often when individuals are not integrated into society and, as a result, he believed social integration was essential to the existence of human society. Spady (1970) took this concept and applied it to college students; students who are not integrated into the social system of an institution are more likely to dropout. College societies include two systems: academic and social. Tinto (1993) recognized that aside from social integration, academic integration must also take place. Students who have trouble integrating academically (e.g., poor grades, academic dishonesty, etc.) are also more likely to dropout. These two types of integration must be achieved simultaneously for students to persist. Tinto suggested the societies of college campuses were different and more complex than the societies examined by both Van Gennep (1960) and Durkheim (1961) and therefore called for a new model.

Just as personal attributes influence a person's inclination to suicide (Durkheim, 1961), so do characteristics influence a student's choice of dropping out (Spady, 1970). Tinto (1993) identified family background, individual attributes, and pre-college schooling as pre-entry attributes of his model. These attributes contribute to students' ability to separate from their high school environment. Once enrolled but before being on campus, students develop their intentions as well as educational and institutional goals and commitments. These goals and

commitments begin to shape a student's expectations of college. Criteria are then self-created for their departure decision.

Background variables and goal development (the separation stage) alone will not accurately depict or predict departure behavior. Tinto (1993) wrote that a longitudinal process and the student's interaction with the institutional environment is the next step (transition stage). Institutional experiences, informal and formal, academic and social, allow the student opportunities to integrate into the college society (incorporation stage). As the student perceives returns on their educational investments, they feel more integrated, become more committed, and are more likely to persist (Tinto, 1975). The opposite is also true. Grade performance and interactions with faculty and staff are the most common variables used to indicate academic integration. They have also been identified as some of the most important elements when predicting persistence. Social integration occurs through a student's involvement in student organizations, campus activities, and friendships. This form of integration varies and depends greatly on the individual. The student's perception of their own social integration is most important.

Once an opportunity for integration has occurred (incorporation), students revisit intentions, goals, and commitments (Tinto, 1993). Sometimes students' goals are not achieved so they choose to depart. Other times, they have lost commitment because of an increased commitment to an external community (family, work, an organization in which they are involved, etc.). In some instances, students do not (or at most insufficiently) academically and socially integrate into a college's society and they often depart. Some students achieve high grades but feel isolated and depart. Others are academically disqualified though they have

become socially integrated. Yet others integrate somewhere in between. Many students, however, choose not to depart and instead persist.

Tinto (1993) developed the conceptual Longitudinal Model of Institutional Departure. Beginning with pre-college, family, and individual attributes, the model progresses and identifies different points where someone may depart. These points are based on the application of the three stages (separation, transition, and incorporation) of Van Gennep's (1960) study. With these variables, students leave past environments and begin their college experience interacting with the college environment. Upon interacting with the college environment, students academically and socially integrate at varying levels. If they transition and integrate well, their commitment rises and they are more likely to persist. Tinto (1975) also defined student sub-categories including those who dropout voluntarily, are academically dismissed, and those who transfer. Students who transfer will be the focus of this project.

An empirical assessment of Tinto's (1975) theory was performed by Braxton et al. (2014). Thirteen propositions were derived from the theory. Several statistical methods including path analysis, multiple linear regression, linear structural relationships, and logistic regression were used for each proposition in the theory (Braxton, Sullivan, & Johnson, 1997). From these tests, each proposition was given strong, moderate, weak, or indeterminate validity status. Braxton et al. (2014) noted the results varied based on whether the institution was a residential university, commuter university, liberal arts college, or a two-year college. Liberal arts colleges had no strong empirical data and two-year colleges only had strong empirical data for one of the thirteen propositions. At residential institutions, only five of the thirteen propositions had strong empirical validity. Community colleges had only two propositions with

strong empirical backing. The lack of empirical backing led to Braxton, Hirschy, and McClendon (2004) revising Tinto's theory.

Transfer Students

Transfer students are a significant portion of the undergraduate population. In a thorough report by the National Center for Educational Statistics (2011), it was reported that 31.7% of freshmen matriculating in the 2003-2004 academic year transferred by 2009. The process of transferring from a two-year to a four-year institution is known as vertical transfer. Berkner, He, and Cataldi (2003) found 32% of students transferred at least once in their collegiate career. Students who transfer from one institution to another are often faced with challenges which may hinder their ability to academically succeed. Most of the research on student transfer has been done using quantitative methods by researchers of community colleges to find who these students are and how they perform academically (Kozeracki, 2001).

Social integration was found to be a significant part of transfer students' transitional issues (Gawley & McGowan, 2006). Researchers looked at qualitative student perceptions of the transfer process. Adapting to a new campus environment was the biggest challenge of transferring, as highlighted by one student, "I was just extremely nervous about coming into the setting" (p. 6). Others mentioned new classroom environments as the most difficult transition. In community colleges, students mentioned group projects to be very common whereas in the university setting personal essays were expected and interaction amongst peers was rare. Living within residence halls was difficult as well because of perceived differences in maturity levels between transfer students who are likely a few years older than first time enrolling freshman. One student expressed her worry, "I just couldn't go into residence with all of these kids that are

much younger than me" (p. 9). These perceptions all influence a student's commitment to both their academic goals and their institution.

This study focuses on the academic integration of transfer students. A foundational and highly regarded report on transfer students' academic integration was a meta-analysis written by Hills (1965). In the early to mid-1960s, community colleges were seen as a gradual acclimation to higher education from high school. The report took many studies into account which were conducted to broadly seek to understand the academic transitions community college students faced when transferring to four-year institutions. In all, over 100 institutions were represented and tens of thousands of students.

An almost universal finding in the studies reviewed by Hills (1965) was the phenomenon he coined transfer shock. This shock encompasses all the transitional issues a student faces when adapting to a new institution's academic and social environment. A major (and perhaps the most researched) aspect of transfer shock is students who experience a drop in GPA after transferring. This post-transfer GPA decrease occurred in 44 of the 46 data sets he reviewed on junior college students who transferred to four-year institutions. In the other two data sets, no decrease in GPA was found. After the initial semester when transfer shock was experienced, another GPA measurement was taken to see if students were able to "recover" and earn the GPA they had at their previous institution. There was a full or partial GPA recovery among 34 of the 38 data sets gathered about continued GPA performance at student's new institutions. A full GPA recovery meant the student achieved a GPA at or above their previous institution cumulative GPA. A partial GPA recovery meant the student earned a GPA above that which they earned in their first semester at their new institution but still below their previous institution cumulative GPA. Though most students experience some recovery, it was noted the magnitude varied widely. The

report also stated 33 data sets were collected to see whether *native students* (those who were enrolled in their first and only institution) received better grades than their transfer colleagues. Native students academically out-performed (demonstrated by a higher GPA) transfer students in 22 data sets, performed equally in seven sets, and were out-performed by transfer students in only four sets. Data were also collected to compare the academic performance of those who transferred from junior colleges and those who transferred from other types of institutions. Junior college transfer students were academically out-performed by transfer students of other institutions in five of the six sets of data. Hills set the framework for future research on transfer students.

Purpose of Grade Point Average and Graduation Metrics

For decades researchers have focused on GPA as the most indicative and important measure of academic success when studying transfer students (Arnold, 2001; Cejda, 1997; Hills, 1965; Kozeracki, 2001). Laanan (2001) noted much research about transfer students is focused on GPA because it tends to play a significant role in admissions decisions. Diaz (1992) also mentioned the importance of student academic performance and called for administrators to be aware of changes in GPA pre- and post-transferring. In his study, he reviewed a comprehensive list of studies (62 in total) on the effect transferring had on GPA. He found a significant decrease in post-transfer GPA in 49 of the studies. In the other 13 studies, an increase, no change, or an insignificant change in GPA was found. Graduation totals have also emerged as a statistic of interest to researchers (Alexander, Ellis, & Mendoza-Denton, 2009; Best & Gehring, 1993; Ishitani, 2008).

Grade Point Average

Alexander et al. (2009) were interested in the relationship between psychosocial variables and academic achievement of transfer students. Their study took place at the University of California, Berkeley, where 33% of the newly enrolled students were transfers and 21% of total undergraduate students were transfers. A vast majority (over 90%) of these transfer students previously attended a California community college. The sample was comprised of 263 students who were anticipating being in their last undergraduate semester of school and who transferred from a community college. Participants took an online survey and were allowed to skip questions which resulted in the true sample size being 211 for the primary question and 191 for the second question of interest. The survey was designed to assess the psychosocial state of transfer students. Two questions were of particular interest to the researchers. The first question addressed *transfer rejection*, providing the participant an opportunity to explain any bias or rejection they perceived as a result of their transfer status. The second question addressed *transfer concealment*, measuring the level of reluctance students had to disclose to anyone their transfer status. Regardless of the levels of transfer rejection and transfer concealment, transfer students were noted to achieve academically at a high level. Nearly all of the students who felt rejected had a GPA in the 3.0 to 4.0 range. Furthermore, of the students who concealed their transfer status, 86% had a GPA in the 3.0 to 4.0 range.

Kinnick et al. (1998) conducted a study of community college students transferring from a metropolitan community college area to the urban university nearby. The idea prompting the research was from the state Governor recommending the development of programs to assist transfer students through the process. To do this, the researchers first sought to understand the transfer patterns of students between the community colleges and the university. They then examined how well the transfer students did academically after transferring. Though many

patterns of transfer activity were observed, for academic assessment reasons, the study focused on those who graduated high school, enrolled first in a community college, then transferred to the university. It was found that the students experienced a decrease of 0.30 from their community college cumulative GPA to first-term university GPA. Consistent with other research (Diaz, 1992; Hills, 1965), the second-term university GPA was higher than the first-term but not as high their community college cumulative GPA.

Gawley and McGowan (2006) found the phenomenon of transfer shock prevalent in their study of students who transferred from Canadian community colleges to universities. To collect data, they analyzed existing documentation, administered a questionnaire, held focus groups, and conducted semi-structured interviews. Access to student's GPA (scale of 1 to 12) at their previous and new institution was granted to the researchers. It was found, for a sample of 87 transfer students, the average post-transfer GPA was 2.37 points lower than the previous institution cumulative GPA after one year at the university. Perhaps more important, the transfer shock persisted into a second year. From the last year at a community college through the second year at the university, aggregate GPA dropped 2.18 points. In the entire sample, only seven students experienced an increase in, or stability of, GPA.

Within the transfer shock literature, researchers began to find individual groups of transfer students whose GPA increased after transferring (Cejda, 1997; Cejda, Kaylor, & Rewey, 1998; Nickens, 1972). When Nickens (1972) examined the phenomenon of transfer shock, his study revealed some students' post-transfer GPA was higher than their previous institution GPA, an occurrence he coined *transfer ecstasy*.

Cejda (1997) sought to find statistically significant differences in GPA before and after students transferred to Benedictine College. Participants in the study were full-time students,

transferring from a community college, and transferring at least 24 credits. He found that students with majors in education, fine arts and humanities, and social sciences earned a higher GPA at Benedictine College than they did at their previous community college, an aspect of transfer ecstasy.

Cejda et al. (1998) also found evidence of a phenomenon of increasing GPA post-transfer. In their study, participants were former community college students who received an Associate's degree, were traditional-aged, and full-time enrolled. After tracking academic progress, it was found that students with majors in fine arts, humanities, and social sciences received higher GPAs. However, these were non-significant.

Graduation

Transfer student populations are growing and their degree completion is of great interest to policy-makers (Arnold, 2001). Graduation rate was a commonly discussed metric of transfer students and was defined by Berkner et al. (2003) as "the percentage of first-time freshman who completed a bachelor's degree at that institution within a certain time period" (para. 7). The term is most often applied to four and six-year periods. This research focused on the student aspect of graduation, not the institution. While the six-year national average graduation rate for a public institution was 45.5%, the six-year rate for students who begin at a four-year public institution was 53.0% (Tinto, 2012). This apparent paradox is possible whenever a student transfers out of an institution. In this case, the institution's graduation rate will go down because the student leaves. Whether or not the student eventually graduates is not reported on the institution's report on graduation rates. The student could, after dropping out of the original institution, transfer and graduate thus increasing the number of graduates at another institution. Transferring, at least in

some instances, appears to help students graduate at a higher rate in a six-year timeframe than if they did not transfer.

Berkner et al. (2003) suggested terms which more accurately depict the attainment of degrees. *Institutional completion rate* was defined the same as graduation rate but drew distinction from *student completion rate* which described the attainment of a bachelor's degree by a student without regard to how many institutions they attended. With these terms and subcategories including degree attainment goals and enrollment status, Berkner et al. identified different categories among those who enrolled first time into four-year institutions. The group with the highest bachelor's degree attainment after six years (68.8%) was recent high school graduates enrolled full-time with the goal to complete a bachelor's degree who were allowed to attend more than one institution. The group with the lowest bachelor's degree attainment rate (i.e., almost 20% lower and only 50.7%) were all students who stayed at their first or original institution. Throughout the study, the two key factors which put students at the highest risk for not completing their degree were whether they were enrolled part-time or if they delayed entry into higher education after graduating from high school.

In the late 1990s, the Oregon Joint Boards of Education (i.e., the Board of Education and the Board of Higher Education) became concerned about the process of transferring from a community college to an Oregon University System campus (Arnold, 2001). As part of the concern, a mandate was issued for the Oregon University System (OUS) and the Department of Community College and Workforce Development (CCWD) to collect data to guide future policymaking. Since the 1995-96 school year, data were collected, matching social security numbers to track the trends of the transfer process. After tracking transfer students from the 1993-94 cohort who transferred into an OUS institution, 63.1% of them had graduated by 1997.

The researchers found this statistic to be high given that only 52.8% of the first-time 1993-94 freshman cohort had graduated by 1999, two years later.

Best and Gehring (1993) wanted to find if there were differences in GPA, graduation rates, and dismissal rates between groups of community college students transferring to a Kentucky university who had earned 60 credits or more and those who earned less than 60 credits. Previous research results suggested students who attained 60 hours before transferring were more able to adjust to the environment of a four-year school and academically achieve at level similar to native students. Subjects of the study were composed of transfer students from two Kentucky community colleges. The majority (90%) of all transfer students enrolled in the fall semesters in 1984 and 1985 were from these two particular community colleges. The majority (75%) of transfer students were enrolled in programs housed in the College of Arts and Sciences or the Schools of Business and Education. Students were then split into two groups, those who earned 60 credits (*transfer juniors*), and those who did not. Also included in the random sample were a group of native students who had acquired between 60 and 89 credits and were enrolled in the College of Arts and Sciences or the Schools of Business and Education. Chi-square statistics were used to detect differences in graduation and dismissal rates while the t-test was used to determine average GPA differences. The graduation rate for transfer students with 60 or more credits was significantly higher than the group of transfer students with fewer than 60 credits ($p < 0.050$). While 40% of transfer juniors had graduated in six years, only 30.9% of transfers with fewer than 60 credits had graduated. When comparing native student and transfer junior graduation rates, there was a significant difference at the 0.01 level. Of the 197 native students, 119 (60.4%) graduated within six years whereas 40% of the transfer juniors graduated in the same time period.

Predictive Demographic Characteristics

Because of the influence demographic variables have on persistence, previous institution cumulative grade point average, age, sex, previous institution type, and BSU college were selected for this study. Though many studies have been conducted analyzing these characteristics, several have not been thoroughly examined and yielded varied results. For instance, minimal research exists on transfer students who are over 25 years old (Ishitani, 2008). Sex, though frequently analyzed, has produced contradictory results (Bremer et al., 2013; Elkins, Braxton, & James, 2000; Peng, 1978). Most research on transfer activity revolves around only vertical transfer and not four-year institution to four-year institution, horizontal transfer (Kinnick et al., 1998). A study of academic integration and achievement would be incomplete without an analysis of a student's academic college. Only in the last few decades have majors been examined (Arnold, 2001).

Previous Institution Cumulative Grade Point Average

Previous institution grade point average has been found to be a significant predictor of post-transfer GPA (Carlan & Byxbe, 2000). In their study, Lower GPA (previous institution GPA), academic college, age, and race were examined to predict Upper GPA (post-transfer GPA). Lower GPA was found to be the strongest predictor of Upper GPA and accounted for 27% of the variance. Saupe and Long (1996) also found previous institution GPA to be a significant and suitable predictor of post-transfer GPA. A multiple regression analysis revealed previous institution GPA accounted for 13% of the post-transfer GPA variance. Other variables examined included number of transfer credits, previous institution type, and type of associates degree earned.

Age

Ishitani (2008) found about three-fourths of transfer students to be 25 years old or younger; they were significantly more likely to depart than students between 21 and 25. Furthermore, students between 21 and 25 years old were more likely to depart than those under 21. Even with the minimal research on how age effects transfer student success, "non-traditional aged transfer students" (over the age of 25) have been excluded from or minimally represented in previous research. Cejda et al. (1998) chose to include only traditional aged transfer students in their study. Though the minority, older students have been found to persist at a higher rate than younger students and have higher GPAs (Bremer et al., 2013). This perhaps reflects an older person's stronger and more mature commitment to their academic goals which may have also been more developed as the student aged.

Sex

Sex has been a variable in most studies on transfer students and their ability to earn high GPAs and persistence to graduation. Elkins et al. (2000) found women were significantly less likely to persist than their male colleagues. This could be because males and females have been found to have differing persistence habits after having similar experiences (Pascarella & Terenzini, 1979, 1980). They found women persisted at a higher, though not statistically significant, rate when they had a higher frequency of faculty interactions to discuss personal problems. Males on the other hand persisted at a lower rate when having a higher rate of similar interactions. Goal commitment was also identified as a quality which had a significant difference across sex on persistence (1980). Goal commitment plays a major role in a student's decision making process of whether or not to persist. Pascarella, Smart, and Ethington (1986) noted sex as a factor which caused different levels of accounted variance in degree completion.

Being a male explained 25.4% of the variance whereas being a female explained only 22.8% of the variance in degree completion.

Bremer et al. (2013) found men were less likely to persist than women. Also in their study, women were found to achieve higher GPAs than their male colleagues. For college students in general, men consistently academically perform inferior to women (Howard, Borland, Johnson, & Baker, 2001; James & Graham, 2010; Stewart & Martinello, 2012). Men have been found to be disproportionally placed on academic probation compared to women (Howard et al., 2001; James & Graham, 2010). This indicates a severe lack of academic integration. Peng (1978), researching vertical transfer students, found no significant difference in grades between females and males.

Previous Institution Type

Ishitani (2008) found that only slightly over a third (35.4%) of transfer students were originally enrolled in a four-year institution, whereas the rest were from community colleges. Because of this and the fact that most transfer activity is vertical transfer, the bulk of quantitative research done has been on vertical transfer students (Kinnick et al., 1998; Peng, 1978). The Berkner et al. (2003) study tracked a nationally representative sample of students from different colleges and universities. Within six years of beginning at a two-year institution, 36% of the students who transferred to a four-year institution completed a bachelor's degree. Arnold (2001) found in-state community college transfer students did not achieve academically as well as those who transferred from any other type of institution. Community college students appeared to be earning lower GPAs and graduating at a lower rate. McCormick and Carroll (1997) compared graduation rates of vertical and horizontal transfers. They found no difference between the two. Stewart and Martinello (2012) researched academic achievement differences between native,

vertical transfer, and horizontal transfer students. They found four-year university transfer students to have the highest grades and the lowest percentages of withdrawing. Hills (1965) found that four-year university transfers were 50% more likely to graduate with honors than vertical transfer students.

Academic College

Until the last few decades, little research was dedicated to examining if student's intended college had any bearing on their ability to academically achieve and graduate. Arnold (2001) found significant differences across different academic fields. The community college transfer students he studied with the lowest post-transfer GPAs had majors in science, social science, and arts and letters. Students enrolled in foreign language and English composition however performed well. Similarly, Cejda (1997) found students whose majors were in business, math, and sciences to experience a decrease in GPA. He also found an aspect of transfer ecstasy, increased GPA, happening to those with majors in education, fine arts and humanities, and social sciences. Gawley and McGowan (2006) found arts and sciences and business majors to experience a lesser dip in GPA than most research suggested, but a dip none-the-less.

The majors with the students most likely to underachieve were general studies and undeclared (Douglas College, 2002; Howard et al., 2001; Stewart & Martinello, 2012). Stewart and Martinello (2012) found general studies programs and undeclared majors to account for just under 10% of vertical transfer students and just over 20% of horizontal transfers. General studies majors had significantly worse GPAs than anyone who had a declared major and insignificantly lower withdrawal rates. In the Douglas College (2002) report, general studies majors accounted for a third of students on probation. Commerce and business administration

students were responsible for another 25% of those on probation. Students majoring in general studies accounted for 30% of students on probation (Howard et al., 2001). Another 23% of students on probation were in engineering programs. It can likely be attributed to a lack of academic commitment that general studies and undeclared major students have low achievement.

Summary

Tinto's (1975) Theory of Individual Departure from Institutions of Higher Education took a previous suicide model and applied it to college students making the decision of whether or not to drop out of or transfer away from their school. A student's background variables and expectations build the base level commitments to both academic goals and institutions. Once enrolled, students interact with the campus environment and must be simultaneously both socially and academically integrated for them to academically succeed. Throughout interactions, students strengthen their commitments and persist, or their commitments weaken and they drop out.

Transfer students are an increasing undergraduate population. They face the same social and academic transition issues like any other student. Most documented, is their struggle to academically integrate as shown by post-transfer GPA and graduation. There are several factors which influence GPA and graduation. It is suggested that the older the transfer student, the more likely they are to earn a high GPA and graduate. Studies on how sex influences these metrics vary. Some studies have suggested women fare better. Others provide evidence that men perform better, while still other state there is no significant difference. Though little research is dedicated to horizontal transfer students, the literature reviewed reveals horizontal transfer students may attain higher grades and have higher graduation totals. General studies and undeclared major students seem to have the lowest grades and graduation totals. Students in the

arts and humanities fields appear to perform better than students transferring with math, science, or business majors.

CHAPTER THREE: METHODOLOGY

Design of the Study

An increased interest in transfer student success calls for an investigation of demographic characteristics which predict post-transfer grade point average (GPA) and six-year graduation. Though much research has been conducted on transfer students and their academic success, few studies have examined how previous institution cumulative grade point average, age, sex, previous institution type, and academic college specifically predict post-transfer GPA and six-year graduation.

Purpose of the Study

The purpose of this study was to examine Ball State University entering transfer students and how to predict post-transfer GPA and six-year graduation based on previous institution cumulative grade point average, age, sex, previous institution type, and BSU college.

Research Questions

The following research questions were asked in this study:

1) Among Ball State University entering transfer students, which of the observed demographic characteristics (i.e., previous institution cumulative GPA, age, sex, previous institution type, and BSU college) are statistically significant predictors of post-transfer GPA?
2) Among Ball State University entering transfer students, which of the observed demographic characteristics (i.e., previous institution cumulative GPA, age, sex, previous institution type, and BSU college) are statistically significant predictors of six-year graduation?

Hypotheses

The following hypotheses were tested in this study:

1) Previous institution cumulative grade point average, age, sex, previous institution type, and BSU college are statistically significant predictors of post-transfer GPA.
2) Previous institution cumulative grade point average, age, sex, previous institution type, and BSU college are statistically significant predictors of six-year graduation.

Population and Sample

The population examined in this study was all entering transfer students at Ball State University (BSU). The sample, 1,857 students, consisted of all entering transfer students in the fall semesters from 2004-2006. Three years of data were assumed to accurately represent the population and provide a large enough sample size to consider results of the study valid. Further, the most current six-year graduation totals were computed for students who entered in these years.

Research Approach

Quantitative methods, numerical measurements representative of a quantity, were used in this study because of their ability to predict post-transfer GPA and graduation (Mendenhall, Reinmuth, & Beaver, 1993). Descriptive statistics such as mean, median, standard deviation, and variance were utilized to describe the individual data points (Howell, 2010). Two different regression analyses, multiple linear regression and logistic regression, were performed to build predictive models for post-transfer GPA and six-year graduation. These inferential statistics were used to make predictions about the population based on the information gathered about the observed sample (Mendenhall et al., 1993). Multiple linear regression was used because its purpose is to predict an output from several input predictor variables (Bowerman, O'Connell, & Koehler, 2005). In this study, the output was post-transfer GPA and the predictor variables were

the observed characteristics. Logistic regression was used to predict the dichotomous dependent variable, six-year graduation (Howell, 2010). The data were considered archival because they had been collected by BSU and were extracted from an existing data base (Shaughnessy, Zechmeister, & Zechmeister, 2003).

Data Collection Procedures

The Office of Institutional Effectiveness (the office responsible for collecting institutional data at BSU) created a Microsoft Excel file of entering transfer students in the fall semesters from 2004-2006. This spreadsheet was given to the researcher when approval to proceed with the study was granted from the Institutional Review Board (Appendix A). Once received, the file was saved and password-protected on the researcher's personal drive in the institution's network.

Only entering transfer students at BSU were included. No names were included in the file. Instead, a de-identified ID number was assigned to each student. Demographic characteristics (i.e., previous institution cumulative grade point average, age, sex, previous institution, BSU college) were given for all students. The researcher searched previous institutions in the 2005 edition of the Carnegie Classification spreadsheet file available for download from the Carnegie Foundation for the Advancement of Teaching (2013) website and coded them as another variable (previous institution type) depending on their level. A zero was assigned to a two-year institution and a one was assigned to four-year institutions. Also included in the data set were the year the student enrolled at BSU, their previous institution cumulative GPA, post-transfer GPA, and semester of graduation if applicable. Another variable (six-year graduation) was created by the researcher. If a student had not graduated by their seventh fall

semester at BSU, they were assigned a zero. If they did graduate by then, they were assigned a one.

No student was identifiable. The data were gathered by the characteristics studied then examined as one data set. The data were analyzed after combining the three years into one set. Individual years were excluded from analysis and reporting.

Statistical Design and Analysis

After the data were collected and delivered to the researcher, they were analyzed using Statistical Package for the Social Sciences (SPSS) version 21. Descriptive statistics (e.g., means, variance, etc.) were computed to describe the data (Howell, 2010). An inferential statistic, specifically regression analysis, was used to make predictions about the population based on information gathered about the sample (Mendenhall et al., 1993). The purpose of a multiple linear regression is to predict an output from several input predictor variables (Bowerman et al., 2005). Therefore, multiple linear regression was used to build a predictive model for post-transfer GPA using the observed variables. To construct a predictive model of six-year graduation, a logistic regression was used. Logistic regression models are used when a dichotomous dependent variable is predicted (Howell, 2010).

For these analyses, previous institution cumulative GPA and age were treated as continuous variables. Sex was treated as a categorical variable with a one indicating female and a zero representing male. Previous institution was categorical and coded as a one for four-year institutions and as a zero for two-year institutions. BSU college was represented by seven dichotomous variables each corresponding to one academic college, and one for majors which were interdepartmental or not housed in an academic college.

Data Presentation

First, demographic data (including descriptive statistics and frequency information) of the different independent variables were presented. Second, the multiple linear regression model to predict post-transfer GPA was presented. Lastly, the logistic regression model to predict six-year graduation was presented. A discussion of the results was provided in chapter five.

Summary

Chapter three was provided to inform the reader of the methods used in this research. Because the study aimed to predict population post-transfer GPA and six-year graduation based on data from a sample, quantitative methods were used. Specifically, multiple linear regression was used to predict a continuous dependent variable (post-transfer GPA) and logistic regression was used to predict a dichotomous dependent variable (six-year graduation) from the independent variables (i.e., previous institution cumulative grade point average, age, sex, previous institution type, BSU college). Data were collected by Ball State University's Office of Institutional Effectiveness, stripped of identifiable information, and given to the researcher.

CHAPTER FOUR: RESULTS

Summary of the Study

This study was designed to predict post-transfer grade point average (GPA) and six-year graduation of Ball State University (BSU) entering transfer students. The prediction models will allow enrollment administrators to make more informed admissions decisions and assist in their identification of at-risk transfer students so appropriate services can be provided. The prediction models were developed using multiple linear regression and logistic regression analyses. Data collected from the sample included student previous institution cumulative GPA, age, sex, previous institution type, and BSU college. Demographic data and the results of the multiple linear regression and logistic regression were presented in this chapter.

Sample

The sample consisted of 1,857 BSU entering transfer students in the fall semesters from 2004-2006. The three years of data provided a sample which was large enough to interpret results and one which accurately represented the population of BSU entering transfer students. Six-year graduation totals are calculated six years after a student transfers, meaning this data set provided the most current totals.

Major Findings

The major findings of the study have been categorized into three sections: demographic data, predicting post-transfer GPA, and predicting six-year graduation. The demographic data section provided an overview of the data collected in the sample. Predicting post-transfer GPA delivered a review of the multiple linear regression analysis performed to develop a model for predicting post-transfer GPA. A summary of the logistic regression analysis used to predict six-year graduation was in the predicting six-year graduation section.

Demographic Data

Transfer student's age averaged 21.82 (Table 1). Previous institution cumulative GPA ranged from 1.500 to 4.000 and had an average of 2.994. The average GPA after a year at BSU (post-transfer GPA) was 1.681, which was lower than previous institution cumulative GPA, and ranged from 0.045 to 4.000. Aside from the decrease in GPA after transferring, the standard deviation was also larger (0.683 compared to 0.541) for post-transfer GPA than it was for previous institution cumulative GPA. Within the data set, some data were missing. Percentages listed in tables were based on the data available.

Age frequency information was provided in Table 2. The youngest transfer student in the sample was 17 years old and the oldest was 59 years old. The frequency of each age was listed along with the percentage of the sample represented by that age. Over 50% of the sample was between the ages of 17 and 20 years old. Students aged 25 or younger accounted for 91.5% of the sample. The three ages with the highest frequency were 19, 20, and 21 years old and they were 73% of the sample. Also illustrated in Table 2 was the distribution of sex in the sample. Males were the slight majority (52.9%) of the sample. In total, there were 982 males and 874 females. The distribution of previous institution types was included in Table 2. Two-year institutions accounted for 682 (36.7%) of the transfer students in the sample. Those who transferred from four-year institutions totaled 1,080 (58.2%). Further, BSU college information was presented in Table 2. Each of the seven colleges was listed along with the category for majors which were interdepartmental or were not housed in a college (i.e., No College/Interdepartmental). For each college, the frequency and percentage were given. Although the College of Architecture and Planning and College of Fine Arts each had less than 5% of the sample (3.2% and 4.6% respectively), the sample sizes of the colleges were large

Table 1

Descriptive Statistics

Variable	n	M	SD	Min	Max
Age	1,852	21.820	4.697	17.000	59.000
Previous Institution Cumulative GPA	1,779	2.994	0.541	1.500	4.000
Post-Transfer GPA	1,759	1.681	0.683	0.045	4.000

Table 2

Ball State University Entering Transfer Student Frequency Information

Variable	n	%
Age		
17	1	0.1
18	6	0.3
19	281	15.2
20	661	35.7
21	409	22.1
22	163	8.8
23	88	4.8
24	59	3.2
25	24	1.3
26	20	1.1
27	11	0.6
28	19	1.0
29	9	0.5
30	12	0.6
31	7	0.4
32	8	0.4
33	8	0.4
34	5	0.3
35	3	0.2
36	3	0.2
37	4	0.2
38	2	0.1
39	4	0.2
40	3	0.2
41	3	0.2
42	3	0.2
43	7	0.4
44	5	0.3
45	6	0.3
46	4	0.2
47	1	0.1
48	3	0.2
49	4	0.2
50	1	0.1
51	3	0.2
53	1	0.1
59	1	0.1

Table 2

Ball State University Entering Transfer Student Frequency Information (Continued)

Variable	n	%
Sex		
Male	982	52.9
Female	874	47.1
Previous Institution Type		
Two-Year	682	38.7
Four-Year	1,080	61.3
BSU College		
College of Architecture and Planning (CAP)	60	3.3
College of Applied Sciences and Technology (CAST)	298	16.4
College of Communication, Information, and Media (CCIM)	181	10.0
College of Fine Arts (CFA)	86	4.7
College of Sciences and Humanities (CSH)	524	28.8
Miller College of Business (MCOB)	280	15.4
Teachers College (TC)	181	10.0
No College/Interdepartmental (NO)	207	11.4
Six-Year Graduation		
No	777	41.9
Yes	1,079	58.1
Total Ball State University Entering Transfer Students	1,856	100.0

enough (over 30) to consider the analysis valid. The College of Sciences and Humanities accounted for the largest percentage (28.2%) of transfer students while the College of Applied Sciences and Technology (16.1%) and the Miller College of Business (15.1%) followed. Lastly, information on whether or not transfer students achieved six-year graduation was given in Table 2. Transfer students who did not achieve six-year graduation totaled 777 (41.9%). The majority of students (58.1%) did achieve six-year graduation.

Predicting Post-Transfer Grade Point Average

To predict post-transfer GPA, multiple linear regression analysis was used. The correlation of the examined variables was displayed in Table 3. The Pearson correlation coefficient (R), coefficient of determination (R^2), adjusted coefficient of determination (Adjusted R^2), and Standard Error (SE) were presented. The Pearson correlation coefficient (R) measured the strength of linear relationship between variables. This value ranges from -1 to 1 and indicates a downward or upward slope, respectfully, to the right of the regression formula. The coefficient of determination, R^2 value, indicated the strength of association between variables. It also measured the percentage of variability in the dependent variable that was explained by the independent variable. The observed value ($R^2 = 0.109$) suggested there is a small amount (10.9%) of variance in post-transfer GPA explained by the model.

Analysis of Variance (ANOVA) information was presented in Table 4. ANOVA was used to determine whether or not the observed R^2 value was statistically significant. Significance of R^2 determined whether or not the model developed predicted the dependent variable. Residual was the difference between the observed and predicted values. The test resulted in a significant ($p < 0.050$) ANOVA which validated the multiple linear regression analysis used to predict post-transfer GPA.

Table 3

Multiple Linear Regression Model Summary for Predicting Post-Transfer GPA

Model	R	R^2	Adjusted R^2	SE
Model	0.330	0.109	0.103	0.617

Table 4

ANOVA for Predicting Post-Transfer GPA

Model	SS	df	MS	F	p
Regression	76.193	11	6.927	18.172	<0.001
Residual	625.117	1,640	0.381		
Total	701.310	1,651			

Table 5 showed the coefficients in the multiple linear regression analysis used to predict post-transfer GPA. Each investigated variable was listed along with unstandardized regression coefficient (β) and standard error (SE), standardized regression coefficient (β), t-test statistic (t), and p-value (p). If the value of β is negative, a positive value for that variable will decrease the post-transfer GPA. For this study, the alpha-level was set to 0.050. Any test with a p-value less than the alpha-level was statistically significant. Because sex, previous institution type, and BSU college were categorical variables, they were coded with dummy variables to be entered in the regression. Dummy variables are independent variables used in regression analyses to include qualitative data. For sex, a dummy value of one indicated female and a zero represented male. Four-year institutions were coded as one and a zero signified a two-year institution in previous institution type. Eight dichotomous variables represented BSU college, each corresponding to one academic college and one for No College/Interdepartmental majors. Incorporated into the constant were data indicating male, previous two-year institution, and a No College/Interdepartmental major. The coefficients in Table 5 developed the following model for predicting post-transfer GPA. Post-Transfer GPA = 0.509 + 0.331× Previous Institution Cumulative GPA + 0.008 × Age - 0.008 × Sex - 0.181 × Previous Institution Type + 0.073 × CAP + 0.178 × CAST + 0.056 × CCIM + 0.074 × CFA + 0.027 × CSH - 0.062 × MCOB + 0.058 × TC.

Because several variables in Table 5 were not significant, another analysis excluding these variables was necessary. In the next iteration of analysis, only previous institution cumulative GPA, age, previous institution type, and whether or not the student was in CAST were used because they were significant predictors in the first analysis. The summary of the revised model was displayed in Table 6. In the new model, 10.5% of the variance in post-

Table 5

Coefficients of Multiple Linear Regression for Predicting Post-Transfer GPA

	Unstandardized		Standardized		
Variable	β	SE	β	t	p
Constant	0.509	0.115		4.423	<0.001
Previous Institution Cumulative GPA	0.331	0.029	0.273	11.350	<0.001
Age	0.008	0.003	0.056	2.376	0.018
Sex	-0.008	0.033	-0.006	-0.237	0.813
Previous Institution Type	-0.181	0.032	-0.135	-5.732	<0.001
BSU College					
CAP	0.073	0.096	0.020	0.761	0.446
CAST	0.178	0.059	0.102	3.030	0.002
CCIM	0.056	0.066	0.026	0.855	0.393
CFA	0.074	0.082	0.024	0.898	0.369
CSH	0.027	0.053	0.019	0.513	0.608
MCOB	-0.062	0.061	-0.033	-1.016	0.310
TC	0.058	0.067	0.027	0.859	0.391

transfer GPA was explained by the model.

The ANOVA information for the revised model was presented in Table 7. Because the significance was <0.001, the ANOVA was significant and validated the revised analysis.

Revised regression coefficients for predicting post-transfer GPA were presented in Table 8. The same information as the original model (unstandardized regression coefficient and standard error, standardized regression coefficient, t-test statistic, and significance) were given in the table. For this analysis, data which indicated previous two-year institution or any college other than CAST were incorporated into the constant. This means if someone was from a two-year institution their previous institution type variable would have a 0. With this as the case, the 0 would be multiplied by the unstandardized regression coefficient (-0.183) equaling 0 and not changing the resulting post-transfer GPA. The coefficients in Table 12 developed the following revised model for predicting post-transfer GPA. Post-Transfer GPA = 0.510 + 0.335 × Previous Institution Cumulative GPA + 0.008 × Age - 0.183 × Previous Institution Type + 0.157 × CAST.

Predicting Six-Year Graduation

A logistic regression model was used to predict graduation within six years. All observed demographics were incorporated into the model. Table 9 illustrated the results of the omnibus tests. The step, block, and model tests compared the predictive power of the model to a constant. Statistically significant ($p < 0.050$) omnibus test results confirm a regression analysis' ability to predict the dependent variable in a statistically significant manor. This test resulted in a p-level of <0.001 which assured the model was effective at predicting six-year graduation.

Table 10 provided a summary of the logistic regression model used to predict six-year graduation. The Cox & Snell and Nagelkerke R^2 statistics listed are referred to as "pseudo-R^2" statistics because they give the proportion of variance in the dependent variable explained by a

Table 6

Revised Multiple Linear Regression Model Summary for Predicting Post-Transfer GPA

Model	R	R^2	Adjusted R^2	SE
Model	0.324	0.105	0.103	0.617

Table 7

Revised ANOVA for Predicting Post-Transfer GPA

Model	SS	df	MS	F	p
Regression	73.721	4	18.430	48.367	<0.001
Residual	627.590	1,647	0.381		
Total	701.310	1,651			

Table 8

Revised Coefficients of Multiple Linear Regression for Predicting Post-Transfer GPA

	Unstandardized		Standardized		
Variable	β	SE	β	t	p
Constant	0.510	0.105		4.846	<0.001
Previous Institution Cumulative GPA	0.335	0.028	0.277	11.756	<0.001
Age	0.008	0.003	0.057	2.433	0.015
Previous Institution Type	-0.183	0.031	-0.137	-5.836	<0.001
CAST	0.157	0.041	0.090	3.867	<0.001

Table 9

Omnibus Tests of Model for Predicting Six-Year Graduation

Type	Chi-square	df	p
Step	151.332	11	<0.001
Block	151.332	11	<0.001
Model	151.332	11	<0.001

Table 10

Logistic Regression Model Summary for Predicting Six-Year Graduation

Statistic	Value
-2 Log likelihood	2,174.804
Cox & Snell R Square	0.084
Nagelkerke R Square	0.114

model. They are considered "pseudo-R^2" because they refer to models with multiple independent variables in contrast with R^2 which reports the proportion of variance in the dependent variable explained by a model with one independent variable. Though the -2 Log likelihood value was high (2,174.804), both the Cox & Snell R Square and Nagelkerke R Square values were both above the designated alpha-level (0.050) which indicated the model had statistically significant predictive power.

The classification table for predicting six-year graduation was displayed in Table 11. The classification table listed the observed data (No or Yes to whether a student graduated in six years) along with the prediction based on the model. Also listed was the percentage correct. The model accurately predicted someone graduating within six years 79.6% of the time. For students who did not achieve six-year graduation, the model was less accurate. In this instance, the model correctly predicted students not graduating only 40.7% of the time. The overall percentage correct (63.6%) was calculated by adding the number of correct predictions (287 correct no predictions and 806 correct yes predictions totaling 1,093 correct predictions) and dividing by all the predictions (1,718).

The coefficients used in the logistic regression analysis used to predict six-year graduation were shown in Table 12. The table listed the variable examined, regression coefficient (β), standard error (SE), Wald test statistic (Wald), p-value (p), and the odds (Exp. (β)). The odds were computed by raising the number e to the value of the regression coefficient and allow for easy comparison of the predictive power individual variables carry. For example, the odds of age were $e^{-.039}$ or 0.962. This meant an increase in one unit of age increased the odds of a transfer student achieving six-year graduation by 0.962. If the value of β was negative, a positive value for that variable would decrease the chance of six-year graduation. For this

Table 11

Classification Table for Predicting Six-Year Graduation

	Predicted		
Observed	No	Yes	% Correct
No	287	418	40.7
Yes	207	806	79.6
Overall Percentage			63.6

Table 12

Coefficients of Logistic Regression for Predicting Six-Year Graduation

Variable	β	SE	Wald	p	Exp. (β)
Constant	-2.518	0.405	38.682	<0.001	0.081
Previous Institution Cumulative GPA	1.091	0.107	109.161	<0.001	2.978
Age	-0.039	0.011	12.154	<0.001	0.962
Sex	-0.325	0.111	8.533	0.003	0.723
Previous Institution Type	0.428	0.106	16.162	<0.001	1.534
BSU College					
CAP	0.095	0.315	0.090	0.764	1.099
CAST	0.632	0.199	10.122	0.001	1.881
CCIM	0.900	0.229	15.446	<0.001	2.460
CFA	0.316	0.278	1.289	0.256	1.372
CSH	0.259	0.179	2.111	0.146	1.296
MCOB	0.348	0.203	2.943	0.086	1.416
TC	0.560	0.226	6.124	0.013	1.751

analysis, data which indicated male, previous two-year institution, and a major which was interdepartmental or not housed in an academic college were incorporated into the constant. The coefficients in Table 16 developed the following model for predicting six-year graduation. Six-Year Graduation = $e^{-2.518} \times e^{1.091 \times \text{Previous Institution Cumulative GPA}} \times e^{-0.039 \times \text{Age}} \times e^{-0.325 \times \text{Sex}} \times e^{0.428 \times \text{Previous Institution Type}} \times e^{0.095 \times \text{CAP}} \times e^{0.632 \times \text{CAST}} \times e^{0.900 \times \text{CCIM}} \times e^{0.316 \times \text{CFA}} \times e^{0.259 \times \text{CSH}} \times e^{0.348 \times \text{MCOB}} \times e^{0.560 \times \text{TC}}$.

Summary

A summary of the descriptive statistics, multiple linear regression model used to predict post-transfer GPA, and logistic regression model used to predict six-year graduation were presented after the analysis of the data. Demographic data were displayed to see the profile of the entering transfer students. Previous institution cumulative GPA averaged 2.994 while the average post-transfer GPA was 1.681. Most students were aged 19-22 years old. Males were the slight majority (52.9%) and almost 60% of the sample was previously enrolled at a four-year institution. Over a quarter of the transfer students were in CSH while CAP and CFA each had less than 5% of the sample. Nearly 60% of the sample achieved six-year graduation.

The original and revised multiple linear regression models developed to predict post-transfer GPA were found to have statistically significant predicting power. The results of the revised analysis found only previous institution cumulative GPA, age, previous institution type, and whether or not the student was in CAST to be statistically significant predictors.

Predicting six-year graduation using a logistic regression model was also found to have statistically significant predictive power. When applied to the data, the model correctly predicted six-year graduation at a rate of 79.6% and had an overall correct prediction percentage of 63.6% of the time. This model found previous institution type, age, sex, previous institution

type, and three of the BSU colleges (CAST, CCIM, and TC) to be statistically significant predictors of six-year graduation.

CHAPTER FIVE: DISCUSSION

Summary of the Study

This study analyzed demographic characteristics of entering transfer students at Ball State University (BSU) in an effort to predict post-transfer grade point average (GPA) and six-year graduation. A knowledge of which characteristics predict these student academic success measures may allow enrollment administrators to develop informed admittance practices. It may also assist educators and administrators identify at-risk transfer students so programs and support services can be provided. Since increased attention has been paid to transfer students and a focus has been made on their academic success by policy-makers, this study was necessary to find characteristics which predict academic success.

Grounded in Tinto's (1975) Theory of Individual Departure from Institutions of Higher Education, this study sought to identify which transfer student characteristics predict academic success. The theory was an adaptation of a previous suicide model developed by Durkheim (1961). Tinto (1975) studied the decision making process of college students regarding continued enrollment at their current institution. Before attending an institution of higher education, a student's base level commitments to their academic goals and institution emerge from their background characteristics and expectations. Upon interacting with the campus environment, students should be simultaneously both socially and academically integrated if they are to continue enrollment and persist to graduation. Student commitments are strengthened or weakened throughout their college enrollment by interacting within the institutional environment. Students whose commitments are strengthened are likely to persist, whereas weakened commitments often lead students to drop out. An increasing undergraduate population on many campuses is transfer students who face the same social and academic integration issues

as any other student. However, there is much interest in and research conducted to understand their inability to academically integrate. This is most demonstrated by low post-transfer GPAs and poor graduation totals. Several factors have historically been understood to influence post-transfer GPA and graduation including but not limited to age, sex, previous institution type, and the students' fields of study.

Data collected by BSU's Office of Institutional Effectiveness were shared after identifiable information was removed. The data set consisted of a sample of 1,857 BSU entering transfer students from the 2004-2006 fall semesters. Information for each of the observed demographic characteristics were provided for each student. Previous institution cumulative GPA and age were treated as continuous variables. Sex, previous institution type, and BSU college were all coded as categorical variables. The first research question focused on predicting the continuous variable post-transfer GPA. A multiple linear regression analysis was used to develop a predictive model. Predicting six-year graduation, a dichotomous variable, was the focus of the second research question thus logistic regression analysis was used to develop a predictive model.

Predicting Post-Transfer Grade Point Average

Whether or not the observed demographic characteristics were statistically significant predictors of post-transfer GPA was the focus of the first research question. Previous institution cumulative GPA was found to be a statistically significant predictor of post-transfer GPA which confirmed the results of previous research (Carlan & Byxbe, 2000; Saupe & Long, 1996). It seems reasonable to believe that student post-transfer GPA could be predicted at least in part by their previous institution cumulative GPA.

The first characteristic was age. This study agreed with the literature that older transfer students achieve higher GPAs than younger transfer students (Bremer et al., 2013). Younger transfer students most likely have less college experience at their previous institutions than older transfer students. As a result of this, it is likely more shocking to academically integrate into a new campus environment. Also if this is true, students who attended their previous institutions for only one year may not have fully integrated into their previous institutions. Undertaking a second environmental change in such a short time is likely to magnify the cultural shock. Academic integration (post-transfer GPA) is probably more difficult if the shock is more.

The second examined characteristic, sex, yielded inconsistent results in the literature with regard to how it influences GPA. In this study, if a transfer student was a female, she had a post-transfer GPA 0.008 lower than her male colleagues. This study agreed with Peng's (1978) study in that sex was an insignificant predictor. It did, however, contradict the Bremer et al. (2013) findings which stated that women earn higher post-transfer GPAs. Through the lens of Tinto's (1975) theory, there is no reason one sex would academically integrate better or worse than the other. This may be the reason previous research and this study have found conflicting results.

Previous institution type was the third observed characteristic and it was found that a statistically significant difference existed. Horizontal transfer students, those transferring from a four-year institution to BSU, were found to earn lower post-transfer GPAs than vertical transfer students, those transferring from a two-year institution to BSU. In contrast, previous researchers concluded horizontal transfer students earned higher post-transfer GPAs (Arnold, 2001; Hills, 1965; Stewart & Martinello, 2012). This discrepancy is perhaps due to the fact horizontal transfer students accounted for 61.3% of the sample for this study whereas most quantitative research on transfer activity focused on vertical transfer students (Kinnick et al., 1998; Peng,

1978). Though the sample had a different composition than the reviewed literature, it is consistent with the population of BSU entering transfer students. Horizontal transfer students comprised 47% of BSU transfer students on average the last six years (Ball State University, 2013c). Though there is minimal research currently available focused on horizontal transfer students, the results of this study will contribute (Kinnick et al., 1998). Many of the entering transfer students in this study came from an Ivy Tech Community College campus, a well-established community college system in Indiana. Perhaps the Ivy Tech Community College curriculum is designed to directly prepare students to transfer to a four-year institution and aimed at those students intending to transfer from the beginning of their academic career. If the curriculum is designed for students to vertically transfer, the transfer shock would be less apparent because they were already accustomed to an institution similar to that which they have at BSU. With less transfer shock, academic integration can be smoother and allow for higher levels of academic success (e.g., post-transfer GPA). Horizontal transfer students may have started at their previous institution without the intent to transfer. If this was the case, the transfer shock they face may be more pronounced because transferring was never a part of their academic plan.

The only BSU college found to be a statistically significant predictor of post-transfer GPA was the College of Applied Sciences and Technology (CAST). Students with majors in this college earned higher post-transfer GPAs than students in other colleges. Other researchers have found students with majors in the sciences to experience lower GPAs (Arnold, 2001; Cejda, 1997; Gawley & McGowan, 2006). This inconsistency could be caused by the difficulty in comparing academic colleges from different institutions. For example, a Nursing major could be in one institution's sciences and humanities college while it could be in the applied sciences

college of another. Business students had lower post-transfer GPAs than their previous institution cumulative GPA in this study which is consistent with the results of previous research (Cejda, 1997, Gawley & McGowan, 2006). It should be noted that students with an interdepartmental, undecided, or general studies major (No College/Interdepartmental) had lower post-transfer GPAs than students in any college other than MCOB. This finding agreed with previous literature (Douglas College, 2002; Howard et al., 2001; Stewart & Martinello, 2012). Students without an undeclared or general studies major are more likely to have trouble committing to academic goals. According to Tinto (1975), a weak commitment to academic goals often leads to poor academic integration and success.

Predicting Six-Year Graduation

The second research question was developed to find statistically significant predictors of six-year graduation. Some previous researchers have concluded that younger transfer students are more likely to graduate (Ishitani, 2008). Others have found older students to be more likely to graduate (Bremer et al., 2013). This study found that as age increased, so did the likelihood of graduation at a statistically significant level. This likely reflects an older transfer student's maturity. Because a transfer student is older, it is likely they have a greater personal cost of not graduating thus they are more committed to their institution and academic goals. This increased commitment contributes to an increased chance of achieving six-year graduation.

This study found women to graduate at a statistically significantly higher level than men. Women have been identified by some previous researchers as the sex less likely to graduate (Elkins et al., 2000). However, other researchers have found women to be more likely to graduate (Bremer et al., 2013; Pascarella & Terenzini, 1979). Previous researchers have proposed that differences in degree completion between sexes are due to different persistence

habits (Pascarella & Terenzini, 1979, 1980). This means though a male and female student experience the same things, they would react differently based on their sex.

The third characteristic, previous institution type, was found to be a statistically significant predictor of six-year graduation. Though horizontal transfer students were found to have a lower post-transfer GPA, they were more likely to achieve six-year graduation. This finding was consistent with previous research which demonstrated horizontal transfer student's ability to graduate was higher than that of vertical transfer students (Arnold, 2001; Hills, 1965; Stewart & Martinello, 2012). Horizontal transfer students may be more likely to achieve six-year graduation because they are not changing institution type. Four-year institutions often have many things in common including a vibrant campus life, a residential campus, and student profile. Perhaps, transferring from a four-year institution to another induces a lesser transfer shock than that experienced by a vertical transfer student who often come from institutions with a less vibrant campus life, a majority of commuters, and different student population. This less difficult integration process could be the reason for higher six-year graduation likelihood.

The final observed characteristic, BSU college, had three of the seven colleges as statistically significant predictors of six-year graduation. They were the College of Applied Sciences and Technology (CAST), the College of Communication, Information, and Media (CCIM), and Teachers College (TC). If a student had a major in any of these colleges they were more likely to graduate than students in other colleges. This could be because several of the top rated and well known programs at BSU reside in these colleges: CAST houses the Nursing program, CCIM is home to the Journalism and Telecommunications program, and as a normal school, BSU is likely to have high graduation numbers from TC.

For some students, transferring appeared to help graduate in a six-year timeframe. A reason for differing rates could be due to the change in institutional environment. As suggested earlier, if someone was not integrated at their original institution, they would likely drop out of that school. However, when students are committed enough to their academic goals, they may choose to transfer their enrollment to a different institution. After transferring and interacting in a new campus environment, they may become socially and academically integrated, commit to their new institution, and persist to graduation.

Suggestions for Practice

An examination of the current admissions criteria for transfer students may be necessary. Students most likely to graduate should be the ones to be admitted to the university. Because this study identified several factors (i.e., previous institution cumulative GPA, previous institution type, BSU college) as very influential to six-year graduation, these factors should be strongly considered when making an admissions decision. Of these factors, previous institution GPA was the strongest predictor of post-transfer GPA. Therefore, a potential transfer student should have a high previous institution cumulative GPA if they are to be admitted since they may soon face the transfer shock that brought the sample average previous institution cumulative GPA of 2.994 to a post-transfer GPA of 1.681.

Upon admittance, requiring entering transfer students to attend a transfer orientation program is a potential solution to helping students understand the upcoming transfer shock they may experience. A part of the program could be dedicated to informing entering transfer students about available academic resources to help them as they transfer from one institution to another. Another opportunity within the orientation program could be breaking up into small groups based on previous institution type. A conversation about post-transfer GPA could be

facilitated with horizontal transfer students because they tend to achieve a lower level than vertical transfer students. In the vertical transfer student group, a discussion could occur about graduation since these students are less likely to graduate than horizontal transfer students. Males could also be made aware that they are more at risk than their female classmates.

Another possible solution to lessen transfer shock is the creation of an intentional entering transfer student integration program. Administrators could offer academic resources to these students throughout their first year at BSU through informal programs and meetings. The development of the current transfer reception to welcome entering transfer students to campus at the beginning of the year could be a beneficial way to connect students to administrators. A larger investment in a peer mentorship program (e.g., Transfer Ambassadors) may also prove beneficial for students. A responsibility of a student with this position could be to regularly check in with the students they are assigned and ensure they are integrating. Another part of the integration program could include individual meetings with students where resources such as the career assessments from the Counseling Center or Career Center would be used to help students define their academic goals. Other resources including those at the Learning Center, Bracken Library, Career Center, Academic Advising, Counseling Center, Student Life, Disability Services, and Multicultural Center could also be introduced to students in meetings. The creation of a scholarship for entering transfer students based on their academic performance at BSU or an opportunity to have lunch with an esteemed faculty member or administrator may also be a good investment and incentive for students to succeed.

Intentional efforts by individual colleges to support entering transfer students may also be helpful. If students met with a representative of their college or department upon arrival to campus, they would immediately have a contact person for if they were experiencing severe

transfer shock. For colleges which have specific requirements before admittance (e.g., a pre-business curriculum before admittance into MCOB), there is a great opportunity to help students be successful. Since college was a significant predictor of six-year graduation for three colleges, it may be worth investing in college-specific interventions.

If an institution has an office dedicated to student retention, the administrators in the office should consider the possibilities they have to help transfer students. Retention professionals could develop individual relationships with students through emails, phone calls, and one-on-one meetings. By proactively reaching out to entering transfer students, these professionals could identify students who are at-risk for any reason and make critical referrals to campus resources such as professors, advisors, or professionals in partner offices. If transfer students had someone they could have a personal connection with, they could experience less of a transfer shock which could allow them to have an easier time integrating into the campus environment. A smoother integration into the campus environment of BSU could allow students to achieve at a higher level academically, possibly earning a higher post-transfer GPA and graduating.

Limitations

One limitation was that only BSU entering transfer students were observed, this is a single-site study. It is not advisable to generalize the results of this study to transfer populations other than that of BSU unless other institutions had a similar student and institutional profile. Further, the study only observed entering transfer students from three academic years. A sample over a longer timeframe would allow administrators to better understand the academic integration issues of entering transfer students. Six year old data was necessary for computing

six-year graduation. However, trends in post-transfer GPA could have significantly changed in this timeframe.

The study was also limited by the fact that the number of credit hours transferred was not taken into account. The foundational expectations and integration issues faced by a student who transferred 60 or more credits would be very different from a student who transferred between 20 and 60 credits and different still would be that of someone who transferred less than 20 credits. Best and Gehring (1993) found those who transferred at least 60 hours, transfer juniors, were more likely to graduate. This fact is likely true because a student who was integrated enough into a campus environment to earn 60 hours will likely be able to understand how to transition to another campus environment smoothly.

Another limiting factor for this research was the little amount of existing research on horizontal transfer students. As mentioned earlier, most previous research on transfer students has been focused on vertical transfer students (Kinnick et al., 1998; Peng, 1978). A final limitation was the quantitative nature of the study. At no point were student voices involved in the research. No explanation can be developed for any of the trends found in this study nor can any discrepancies from previous research findings be cleared up or understood.

Recommendations for Future Research

Because this study focused purely on quantitative data, supplemental qualitative research study would bring valuable student voice to the results. A study attempting to discover and understand the experiences of transfer students at BSU in their first year may be helpful. Since the sample average previous institution cumulative GPA was 2.994 and the average post-transfer GPA was 1.681, research should be conducted to help administrators understand why there is a large decline in GPA. Research should also be done focusing on the transfer experience beyond

the first year on campus. Since BSU requires a minimum 2.000 GPA to graduate and 58.1% of transfer students achieve six-year graduation, something must happen for students to be able to "recover" and earn a GPA high enough to earn a degree.

Several other variables should be researched to see if they are statistically significant predictors of post-transfer GPA and/or six-year graduation. Whether or not a transfer student is enrolled full- or part-time is one such variable. Ethnicity is another variable which may give insight into what makes an academically successful transfer student. Reason for leaving the previous institutions (e.g., academic dismissal, transferring to gain access to a specific academic program, transferring to be closer to home, etc.) is another variable which may influence academic success measures and might be worth researching.

Future researchers should also look deeper into previous institution type. Within the group of four-year institutions represented in the sample of this study, many were branch campuses of major universities. Researchers may benefit from making sub-categories of four-year institutions differentiating between main and branch campuses. Previous institution type could also be categorized not merely as two-year or four-year but by levels of admissions selectivity. Transfer students from schools which have high admissions standards may be more likely to be successful after transferring than those transferring from less selective previous institutions. Another aspect of previous institution type not investigated in this study was whether the institution was for- or not-for-profit. Whether a school was private or public was also ignored in this study. Regression analysis for each of these previous institution types may reveal interesting differences in student success. These different ways to classify previous institution type could provide future researchers with a better understanding of how to predict entering transfer student academic success.

Examinations of individual colleges may also help administrators understand transfer shock. CAST was a significant predictor of both post-transfer GPA and six-year graduation. A potential explanation could be the nature of the programs in this college. Some two-year schools may have curriculum designed for students to be fed right into some BSU programs (nursing and tech majors in particular). TC and CCIM were the other two colleges which significantly predicted six-year graduation. Indiana has many articulation agreements with community colleges to get students into TC. Research should focus on these colleges to see what characteristics they have to help students be successful. Learning whether student success comes from previous academic experience would be helpful for enrollment administrators in making admissions decisions.

Categorizing students by their class standing (i.e., freshman, sophomore, junior, senior) may also provide insight to which entering transfer students are likely to be successful. If models were developed for each class, there may be significant differences in their ability to succeed.

These suggestions for future research would further help enrollment administrators tailor their admission practices. Educators and administrators may also continue to benefit by better identifying at-risk transfer students and providing them with resources and services to help them be successful. Qualitative data would allow administrators to learn what content in programs and support services would best benefit transfer students and help them academically succeed.

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APPENDIX A: INSTITUTIONAL REVIEW BOARD APPROVAL

Office of Research Integrity
Institutional Review Board (IRB)
2000 University Avenue
Muncie, IN 47306-0155
Phone: 765-285-5070

DATE:	December 10, 2013
TO:	Charlie Clausen
FROM:	Ball State University IRB
RE:	IRB protocol # 546195-1
TITLE:	Transfer Talk: A Predictive Model of Transfer Student Academic Success
SUBMISSION TYPE:	New Project
ACTION:	APPROVED
DECISION DATE:	December 10, 2013
REVIEW TYPE:	**EXEMPT**

The Institutional Review Board reviewed your protocol on December 10, 2013 and has determined the procedures you have proposed are appropriate for exemption under the federal regulations. As such, there will be no further review of your protocol, and you are cleared to proceed with the procedures outlined in your protocol. As an exempt study, there is no requirement for continuing review. Your protocol will remain on file with the IRB as a matter of record.

Exempt Categories:

	Category 1: Research conducted in established or commonly accepted educational settings, involving normal educations practices, such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.
	Category 2: Research involving the use of educational test (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior
	Category 3: Research involving the use of educational test (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior that is not exempt under category 2, if: (i) the human subjects are elected or appointed officials or candidates for public office; or (ii) Federal statute(s) require(s) without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter.
x	**Category 4**: Research involving the collection of study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.

	Category 5: Research and demonstration projects which are conducted by or subject to the approval of Department or agency heads, and which are designed to study, evaluate or otherwise examine: (i) public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in methods or levels of payment for benefits or services under these programs.
	Category 6: Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed or (ii) if a food is consumed which contains a food ingredient at or below the level and for a use found to be safe, by the Food and Drug Administration or approved by the Environmental Protection Agency or the Food Safety and Inspection Service of the U.S. Department of Agriculture.

Editorial Notes:

1. Exempt Approval (Archive De-Identified Data)

While your project does not require continuing review, it is the responsibility of the P.I. (and, if applicable, faculty supervisor) to inform the IRB if the procedures presented in this protocol are to be modified or if problems related to human research participants arise in connection with this project. **Any procedural modifications must be evaluated by the IRB before being implemented, as some modifications may change the review status of this project.** Please contact (ORI Staff) if you are unsure whether your proposed modification requires review or have any questions. Proposed modifications should be addressed in writing and submitted electronically to the IRB (http://www.bsu.edu/irb) for review. Please reference the above IRB protocol number in any communication to the IRB regarding this project.

Reminder: Even though your study is exempt from the relevant federal regulations of the Common Rule (45 CFR 46, subpart A), you and your research team are not exempt from ethical research practices and should therefore employ all protections for your participants and their data which are appropriate to your project.

Bryan Byers, PhD/Chair
Institutional Review Board

Christopher Mangelli, JD, MS, MEd, CIP/Director
Office of Research Integrity