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Transfer Student Success:

The Role of Initial College Choice

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Abstract

This study on transfer student success is grounded in a student-centered initial college choice-persistence nexus model that asserts there is a nexus between the factors that affect college choice and the factors that affect persistence to a baccalaureate. Utilizing two-group path analysis, this study found that for community college transfer students to a Midwestern, public research university total transfer GPA from community colleges, total number of hours transferred from a community college, completion of college algebra, completion of freshmen English, and first-semester GPA after transfer had a positive effect on baccalaureate attainment. For transfer students from four-year institutions to the same Midwestern, public research university only first-semester GPA after transfer and total number of hours transferred from a four-year institution had a positive effect on baccalaureate attainment.

Key words: Postsecondary transfer students, initial college choice, persistence

Transfer Student Success: The Role of Initial College Choice

Background and Purpose

Transfer students are a distinctive group of students for public, research institutions to adopt. Recruiting transfer students is only worthwhile for both the transfer students recruited to the institution and for the institution itself if these students persist to graduation. Many factors have been considered when studying transfer student success, including the type of institution that a student attended prior to transferring. In particular, several studies have scrutinized the effects of attendance at a community college prior to transfer and the possible benefits and /or drawbacks to the student.   Studying the success of transfer students based on the type of transfer institution has been increasingly difficult due to an increasing number of transfer students who have attended another four-year institution prior to transferring, if not multiple institutions from both sectors. This type of "swirling" (de los Santos & Wright, 1990) makes it difficult to determine if previous academic experiences and previous attendance at other institutions have an effect on future academic performance. However, it has been shown that earlier decisions such as whether or not to attend college, and if so, what college to attend, and the factors that are taken into consideration in order to make these decisions do have an effect on college student persistence (St. John, Paulsen, and Starkey, 1996). This study relies on a nexus model of initial college choice and persistence to analyze the effects of previous academic history on the completion of a baccalaureate degree at a public, Midwestern research university (MRU) while controlling for student demographic variables. Specifically, this study analyzes the difference of these effects between transfer students who initially chose to solely attend community colleges and transfer students who initially solely chose to attend four-year institutions prior to transferring to MRU.

When comparing research of transfer student success, it is important to note the definition of transfer student or the definition of the original cohort that is being utilized in each study. There is a wide range of definitions utilized, and depending upon the definition of the initial cohort, varied levels of transfer student success have been found. For example, Rouse (1995) compared two initial cohorts of students from the High School & Beyond data developed by the National Center for Educational Statistics; those whose first institution of attendance was a community college and those whose first institution of attendance was a four-year institution. Utilizing this extremely broad definition for an initial cohort, Rouse (1995) found that for the cohort that initially enrolled in a community college, 11% graduated with a baccalaureate, compared to 43% of the cohort that initially enrolled in a four-year institution. Rouse did not limit the four-year cohort to those who transferred to another institution. Thus, the population of community college transfer students would have had to transfer in order to obtain the baccalaureate while the four-year college students would not have had to transfer.

Other studies have limited the students in the initial cohort to those who have completed a certain number of credit hours at a community college prior to transferring. In a study of one state's system of institutions, Arnold (2001) reported a 62% graduation rate of community college students with 45 to 89 transfer credit hours. Cohen and Brawer (2003) defined transfer students as those who enter a community college with no prior college experience, earn at least twelve credits within four years of entry, and take one or more classes at an in-state, public university within four years. The authors found that 70% of transfer students persist to their junior year utilizing this definition. The highest graduation rates have been found in studies that include associate degree attainment in the definition of transfer student. For example, in an eight-year longitudinal study of transfer students in Florida, 74% of transfer students who earned

an Associate of Arts degree prior to transferring graduated (Goodman, Copa, and Wright, 2004,

as cited in Adelman, 2005). Studies that include earning an associate's degree in the definition

of transfer student inherently limit the initial cohort to students who attended a community

college due to the fact that four-year institutions do not typically award an associate's degree just

as studies that include students that initially begin at a four-year institution may inherently

include a large number of students who never transferred due to the fact that the baccalaureate is

offered at the same institution.

This study used a fairly exclusive definition of transfer student based upon admissions

requirements at the receiving institution, MRU. To be included, students had to have earned 24

credit hours from other institutions prior to enrolling at MRU and had to have earned an overall

2.0 GPA from the previously attended institutions prior to transfer. Additionally, students were

categorized into two groups based upon the type of institution they attended prior to transfer. In

order to isolate the initial college choice between community colleges and four-year institutions,

only students who solely attended one type of institution were included in the study. Students

who solely attended community colleges were categorized as community college transfer

students, whereas students who solely attended four-year institutions prior to transfer were

categorized as four-year transfer students. Students who attended more than one type of

institution prior to entrance into the institution were not included in the analysis. The findings

have implications for influencing critical views of community colleges by tempering them with

the knowledge that transfer student success may also be affected by the same factors that affect

initial college choice.

Methods

Conceptual framework. In a study of transfer student baccalaureate attainment, Author, McNerny, and Arnold (1993) grouped studies of transfer student success into three categories: (a) student-centered explanations, (b) institution-centered explanations, and (c) societal analyses. This study utilizes a student-centered approach that is grounded in both student persistence theory and college choice theory. In particular, a nexus model of college choice and persistence based upon the model developed by St. John, Paulsen, and Starkey (1996) functions as the theoretical framework. Student-centered persistence models have found that a student's likelihood of earning a baccalaureate is increased the more he or she is able to become socially and academically integrated into an institution of higher education (Astin, 1975; Bean, 1980; Bean & Metzner, 1985; Tinto, 1975, 1987, 1993). More recently, Townsend and Wilson (2009) found in a qualitative study that academic integration had a stronger influence on persistence to baccalaureate attainment than social integration for community college transfer students to a four-year institution. Factors that have been shown to affect baccalaureate attainment are academic preparation, educational aspirations, involvement in social organizations at an institution, and other measurements of academic and social integration (e.g., Freeman, 2007; Koker & Hendel, 2003; Pascarella, Smart, & Ethington, 1986; Tinto, 1975, 1987, 1993, Author & Wilson, 2009).

Extending the longitudinal process of college persistence back to when a student initially chooses a college is a novel approach to research of student persistence and transfer student success. A theory developed by St. John, Paulsen, and Starkey (1996) is based on the notion that the same factors that affect a student's choice of institution also affect student persistence. The theory focuses primarily on financial factors that affect college choice and persistence, including the amount of financial aid received by students. St. John, Paulsen and Starkey (1996) felt that

there were other factors besides financial motives common to both the college choice decision

and the decision to remain in college or complete a degree. The proposed study focuses on the

factors that affect a student's choice to attend a community college or four-year institution and

how these factors sequentially affect persistence to degree completion. The theoretical

framework is a nexus between college choice and persistence; however, the college choice

decision is framed in the decision to initially attend a community college or four-year institution

and therefore embodies all of the factors that may influence that decision, as opposed to only the

financial motives to attend one institution over another. Thus, this study utilizes a modified St.

John, Paulsen, and Starkey (1996) model developed by the authors based on the nexus of initial

college choice and factors that affect persistence. The model is depicted in Figure 1 below.

[Insert Figure 1 here]

Population. The population for this study was students who transferred to the Midwestern

public research institution during from fall semester of 1992 to the summer semester of 2001.

There were 14,337 transfer students in the original population. Only students who completed 24

hours prior to transfer, and who had at least a 2.0 transfer GPA were included in the population.

These restrictions are in line with the admission requirements for transfer students to this

institution during the selected time period. If a transfer student did not meet these admissions

requirements, he or she would have had to meet first-time freshmen admissions requirements.

Thus this restriction controls for varying entrance requirements. After taking the transfer student

admissions requirements into consideration, there were 11,862 students in the study's population.

The population was limited to students who solely attended community colleges prior to

transfer and students who solely attended four-year institutions. As more and more students are

attending multiple institutions, there is a chance that some of the students who transferred to the

institution during this period transferred in credit from both two-year and four-year institutions. In some studies, the type of sending institution is determined by the type of the most recent institution attended. By collecting course level data of students' course credits earned prior to entrance at the institution under study, the researchers were able to exclude students who attended more than one type of institution. Doing so is beneficial particularly because this study examined the differences in effects between students who transferred from community colleges and those who transferred from four-year institutions. Of the transfer students who met the transfer student admissions requirements, 31% (3,634 students) solely attended community colleges, 20% (2,322 students) solely attended four-year institutions, less than 1% (47 students) solely attended technical schools, and 49% (5859 students) would be considered "swirling" students. Thus the final population of students for this study was 5,956 transfer students with 3,634 (61%) solely attending community colleges and 2,322 (39%) solely attending four-year institutions prior to enrolling at MRU. As can be seen in Table 1 below, the population of transfer students who solely attended community colleges differs from the population of transfer students who solely attended four-year institutions.

[Insert Table 1 here]

For the overall population, men were 56% of the population whereas women made up 44% of the population. Men made up a larger proportion (59%) of the community college population than they did of the four-year college population (51%). The difference in proportion between the two-groups (community college transfer students and four-year college transfer students) was statistically significant.

Students were placed into three ethnic categories: 1) white, non-minority; 2) minority; 3) refused to indicate or unknown. There was no statistically significant difference in the ethnicity

of the group who attended community colleges and the group who attended four-year institutions. Overall, 85% (5,088 transfer students) were white, non-minorities. Of the group of transfer students who solely attended   community colleges, 11% (391) were minority students, while 10% (237 transfer students) of the transfer students who solely attended four-year institutions were minority students. The 240 students with an unknown ethnicity were not included in the analysis. Therefore, there were 146 community college transfer students and 94 four-year college transfer students excluded from the analysis.

Transfer students included in the study were aggregated into two groups: those who received a Pell Grant at anytime while in attendance at MRU and those who did not. Overall, 33% (1,953 transfer students) of the transfer students were awarded a Pell Grant at some time during their enrollment at the public, Midwestern research university (MRU). There was a statistically significant difference in the proportion of transfer students from the community college who earned a Pell Grant (35%) and the proportion of transfer students from a four-year college who earned a Pell Grant (29%). This is evidence that the population of transfer students who attend community colleges have more financial need after transfer to a four-year institution than those who previously attended other four-year colleges.

The initial discipline of study into which a transfer student entered at MRU was included in the group of student demographic variables. Three groups of disciplines were defined: 1) Science, Technology, Engineering, and Mathmatics (STEM), 2) Non-STEM field, and 3) Undeclared. Overall, 66% (3,937 transfer students) of the population enrolled in a Non-STEM field while 23% (1,368 transfer students) entered into MRU without a major. There was a statically significant difference in the proportion of community college transfer students within the three groups (10% - STEM, 67% - Non-STEM, and 23% - Undeclared) and the proportion of

four-year college transfer students within the three groups (12% - STEM, 65% - Non-STEM, and 23% - Undeclared).

Transfer students are allowed to initially enroll at MRU during a fall, winter, or summer semester. For the purpose of this study, transfer students were grouped into those who initially enrolled during a fall semester (77%) and those who initially enrolled during a winter or summer semester (23%). There was a statistically significant difference in the proportion of community college transfer students who initially enrolled during a fall semester (79%) and the proportion of four-year college transfer students who initially enrolled during a fall semester (75%).

The majority of the transfer students included in this study (71%) enrolled as a full-time student when they initially attended MRU. Seventy percent (2,558 transfer students) of the community college transfer students enrolled at MRU full-time while 73% (1,691 transfer students) of the four-year college transfer students enrolled at MRU full-time. This was a statistically significant difference.

The students who transfer to MRU are typically traditional-age (18 – 23 years old). In the study population, 86% (5,115 transfer students) of the transfer students were traditional age. Of the students who solely attended community colleges, 85% (3,080 transfer students) were traditional age while 88% (2,035 transfer students) of the students who solely attended four-year colleges were traditional age. This difference was statistically significant.

Transfer GPA, transfer hours, completion of college algebra, completion of freshmen English, and first-semester GPA were also included in the analysis. Table 2 below shows that there was a difference in completion of college algebra and average first-semester GPA between the two groups of students. For continuous student demographic variables, analysis of variance (ANOVA) was utilized to determine if there was a statistically significant difference between the

two groups. For dichotomous student demographic variables, chi-square analysis (X^2) was utilized to determine if there was a statistically significant difference between the two groups.

[Insert Table 2 here]

The overall average transfer GPA was 2.95. There was no statistically significant difference in the average transfer GPA of community college transfer students (2.96) and the average transfer GPA of four-year college transfer students (2.95). The average number of transfer hours for the population included in the analysis was 53.19. Similar to transfer GPA, there was no statistically significant difference in the average number of transfer hours between community college transfer students (53.53 transfer hours) and four-year college transfer students (52.68 transfer hours).

Fifty-five percent of transfer students included in the analysis completed college algebra prior to enrolling at MRU. There was a statistically significant difference in the proportion of community college transfer students (49%) who completed college algebra prior to transferring compared to the proportion of four-year college transfer students (38%) who completed college algebra prior to transferring. Unlike college algebra, there was not a statistically significant difference in the proportion of community college transfer students who completed freshmen English (71%) and the proportion of four-year college transfer students who completed freshmen English (73%). Overall, 72% of transfer students completed freshmen English prior to transferring to MRU.

The average transfer GPA for community college transfer students was 2.96 while the average first-semester GPA for community college transfer students was 2.33. Four-year college transfer students' average transfer GPA was 2.95 while the average first-semester GPA for this group was 2.58. While there was not a statistically significant difference in transfer GPA

between these two-groups, there was a statistically significant difference in first-semester GPA. Table 2 also shows the difference in graduation rate between community college transfer students (50%) and four-year college transfer students (59%). This difference was statistically significant. The overall graduation rate for the transfer students included in the study was 54%.

Data Collection Procedure. Student demographic information including transfer GPA, number of hours completed prior to transfer, first-semester GPA at the receiving institution, baccalaureate attainment status, ethnicity, gender, Pell Grant status, initial major at the receiving institution, and enrollment status were provided from the institution's registrar. Additionally, courses taken prior to transfer and their course equivalencies at the receiving institution, MRU, were provided. The subjects were separated into those who solely attended community colleges and those who solely attended four-year institutions. Subjects who attended more than one type of institution prior to transfer were not included in the study.

Variables. Authors of previous research on transfer student success have utilized several measurements of success. One of the most widely utilized measures of transfer student success has been the drop in first-semester grade point average (GPA) at a receiving institution as a measurement of transfer shock (Hills, 1965). Transfer students from a community college have been found to drop half a grade point at a university after transferring (Author, McNerny, and Arnold, 1993). Different variables have been found to affect transfer shock, including gender, academic discipline, and age (Cejda, Kaylor, &Rewey, 1998; Keeley & House, 1993; Author, McNerny, and Arnold, 1993).

Many of the factors that have been found to affect first-semester GPA have also been found to affect baccalaureate attainment, another measure of transfer student success. These variables can be grouped into two categories: (a) entering academic history, and (b) student

demographics. Entering academic history includes a student's previous academic experience including transfer GPA, number of transfer hours, and coursework completed prior to transferring. In terms of persistence research, entering academic history acts as a proxy for academic integration. Transfer student success literature supports the theory that academic integration has a positive effect on degree completion. In a multi-institution system, Mullen and Eimers (2001) found that for every one point increase in transfer GPA, a student's likelihood of graduating increased 40%. The number of credit hours completed prior to transferring also has a positive effect on baccalaureate attainment. Koker and Hendel (2003) found that the more hours a transfer student completes prior to transferring, the more likely he or she is to graduate. Lastly, the coursework completed prior to transfer has been investigated in previous research and has been found to affect degree completion. Utilizing the National Educational Longitudinal Study:88/2000, Alfonso (2006) found that the more college math and science courses completed prior to transfer, the more likely a student would be to graduate.

In addition to entering academic history, student demographics have also been found to affect baccalaureate attainment. Student demographics include gender, minority status, enrollment status, low income status, age, and discipline of study.   Gender has been found to affect baccalaureate attainment with women graduating at a higher rate than men. In a study of the success of students who transferred to a multi-institution study, Mullen and Eimers (2001) found that women were 1.26 times as likely to graduate as men. In a study of the success of students whose initial institution was a community college that utilized national data, Freeman (2007) found that women were 2.29 times as likely to earn a baccalaureate as men.

Other variables besides gender affect baccalaureate attainment. Minority status has also been found to affect degree completion. Pascarella, Smart, and Ethington (1986) found that

being a minority was not a significant effect on graduation status of women who initially started at a community college, but that minority status did have a negative effect on degree completion for men who initially started at a community college. Baccalaureate attainment has also been shown to be affected by enrollment status. Utilizing a structural equation model that included a variable for type of initial institution (community college or four-year), Alfonso (2006) found that full-time enrollment was a statistically significant, positive indicator of baccalaureate attainment. Receiving financial aid can be used as a proxy for socioeconomic status which has also been shown to affect baccalaureate attainment. Alfonso (2006) found that students in the lowest socioeconomic quartile were less likely to graduate than students in the upper three quartiles.

Additional factors affect baccalaureate attainment. One is age. Community colleges are known for having a higher population of nontraditional age students. Author and Eimers (2004) found that regardless of the type of institution a transfer student initially attended, nontraditional age students were less likely to graduate than traditional age students. It has also been shown that declaring a major prior to transferring increases the likelihood that a student will graduate by as much as 25% (Alfonso, 2006). The discipline in which a student majors once he or she transfers has an effect on baccalaureate attainment as well, with students majoring in the sciences less likely to succeed (Mullen & Eimers, 2001).

Analytical Procedures. A quantitative approach was utilized to analyze the direct and indirect effects of transfer GPA, number of hours transferred, completion of college algebra prior to transfer, completion of freshman English prior to transfer, and first-semester GPA at MRU upon persistence to graduation. The effects were analyzed for two groups of students (those who solely attended community colleges prior to transfer, and those who solely attended four-year

institutions prior to transfer) while controlling for the effects of student demographic variables on entering academic history variables, first-semester GPA, and degree attainment. The effects between the two groups were also analyzed to determine if the effects differed depending upon the type of institutions attended prior to transfer.

Path analysis was utilized to study the effects of entering academic history on first-semester GPA and baccalaureate attainment. The model simultaneously analyzed the effect of first-semester GPA on baccalaureate attainment. An advantage of path analysis over multiple regression is that it allows a variable to be entered as both a predictor and criterion variable (Kline, 1998). When the dependent variable in path analysis is continuous, the estimated parameters are synonymous with regression coefficients in linear regression. *M*plus software was utilized because it is compatible with using a categorical dependent variable (i.e., baccalaureate attainment) and a continuous mediating variable (i.e., first-semester GPA) with multiple groups (community college and four-year college transfer students). When maximum likelihood estimation is utilized to estimate parameters onto a dichotomous variable, the parameter estimates produced by *M*plus are synonymous with logistic regression coefficients (Mùthen and Mùthen, 2007b). Additionally, the parameter estimates generated utilizing maximum likelihood with standard errors and a chi-square statistic are robust to non-normality. This was beneficial due to the fact that so many of the predictor variables were non-normal dichotomous.

Several different methods have been suggested as fit indices in path analysis. This study utilized the Akaike Information Criterion (AIC) and the Bayesian Information Criterion (BIC) to determine the model of best fit. For both measures, the lower the value, the better the model fit

(Cohen, Cohen, West, & Aiken, 2003; Kline, 1998). The AIC has been known to be extremely sensitive to sample size. The BIC was developed to correct for this sensitivity.

To determine if there were differences in the effects of transfer GPA, transfer hours, completion of college algebra, completion of freshmen English, and first-semester GPA on degree attainment an iterative process was utilized that began with a measurement model. In this initial measurement model, the effects of transfer GPA, transfer hours, completion of college algebra prior to transfer, completion of freshmen English prior to transfer, and first-semester GPA were allowed to be estimated freely for community college transfer students and four-year college transfer students. In other words, for the core model (excluding control variables) all nine paths for the community college transfer students were estimated separately from the nine paths for the four-year transfer students. Thus, eighteen paths were estimated along with the paths for the control variables.

Next, a model with the effects of transfer GPA, transfer hours, completion of college algebra, completion of freshmen English onto first-semester GPA and the effects of transfer GPA, transfer hours, completion of college algebra, completion of freshmen English, and first-semester GPA on degree attainment were constrained between the two groups of transfer students to MRU. In other words, nine paths were estimated in the core model for both the community college and four-year transfer students along with paths for the control variables estimated separately between the two groups. In path analysis, the goal is to estimate the most parsimonious model as possible, or the model with the least number of parameters estimated, without losing explanatory value (Kline, 1998). In order to determine if too much explanatory value is lost by using the more parsimonious model, the researcher analyzed the difference in chi-square between the two models. The Satorra-Bentler scaled chi-square was used to

determine if there was a significant difference in chi-square, or significance of the model, between the measurement model and the constrained model (Muthén & Muthén, 2007a).

A similar process was utilized to determine if there was a significant difference in chi-square by releasing specific constraints between the two-groups of transfer students. Starting with the fully constrained model, each individual constrained path was released and the model was analyzed. For this first round of releasing constraints, each core model estimated ten different paths: eight that were equal for both community college and four-year transfer students and two that were separately estimated for each group that measured the same effect. The difference in chi-square test was utilized to determine the difference in chi-square for each individual effect. The path with the largest statistically significant difference in chi-square was released. The process was repeated on the most recent constrained model until none of the constraints to be released provided a statistically significant difference in chi-square, or that adding more paths to the model would not increase the explanatory value of the model.

Findings

Effects of Entering Academic History While Controlling For Student Demographics. Neither model for each individual group of transfer students accounted for a considerable amount of variance in first-semester GPA and degree attainment. The model for community college transfer students only accounted for 24% of the variance in first-semester GPA and only 32% of variance in degree attainment according to the R^2 and pseudo-R^2. The model for students who transferred to MRU from another four-year institution only accounted for 23% of variance in first-semester GPA and 28% of the variance in degree attainment.   A summary of the findings for community college transfer students may be found in Table 3 and a summary of the findings for students who transferred to MRU from other four-year institutions may be found in

Table 4. Similar to previous research, transfer GPA had a statistically significant positive effect

on first-semester GPA and degree attainment for community college transfer students and a

statistically significant positive effect on first-semester GPA for four-year transfer students.

Author, McNerny, and Arnold (1993) found that the most significant predictor of the university

cumulative GPA for a community college transfer student was transfer GPA. Carlan and Byxbe

(2000) found that transfer GPA accounted for 27% of the variance in upper division GPA for

community college transfer students and that for every one point increase in transfer GPA, upper

division GPA increased 0.67 points.

[Insert Table 3 and Table 4 here]

The positive effect of transfer GPA on first-semester GPA and degree attainment also

supports the persistence theories of Astin (1975), Tinto (1975), Bean (1980), Bean and Metzner

(1985), and St. John, Paulsen, and Starkey (1996). Transfer GPA is a measurement of academic

integration at the sending institution. The more academically integrated a student becomes, the

more likely he or she is to succeed at the receiving institution. The initial college choice-

persistence nexus model utilized in this study was also supported by the finding that transfer

GPA has a positive effect on transfer student success particularly for community college transfer

students. Academic integration at the sending institution has been shown by the model to

support transfer student success at the receiving institution.   Additionally, the positive effect of

transfer hours on first-semester GPA and degree attainment supports the effect of academic

integration on transfer student success.

Transferring with more credits or transfer hours was found to have a statistically

significant positive effect on first-semester GPA and degree attainment for community college

four-year transfer students. Koker and Hendel (2003) found that the more hours a transfer

student completed prior to transfer, the more likely the student was to graduate. As the number of hours transferred into an institution represents a certain level of academic integration at a sending institution, the positive effect of transfer hours on first-semester GPA and degree attainment supports longstanding theories on college student persistence (Astin , 1975; Bean, 1980; Bean & Metzner, 1985; St. John, Paulsen, & Starkey , 1996; Tinto, 1975).

There were conflicting results regarding the completion of college algebra and freshman English prior to transfer. Both variables had a statistically significant negative effect on first-semester GPA for four-year transfer students. However, for community college transfer students, completion of college algebra and freshmen English had a statistically significant positive effect on degree attainment. In the context of degree attainment, this finding is similar to what has been found in previous research. Alfonso (2006) found that the more college mathematics and science courses completed prior to transfer, the more likely a student is to graduate. Adelman (2005) provided a different measure of course completion prior to transfer. He reported that for students with a higher than 20% withdrawal rate and repeat grades in college level math, there was a negative effect on baccalaureate degree attainment. The measure for course completion in this study did not take into account the number of times the course had been attempted prior to transfer.

Similar to previous research, there was a drop in average first-semester GPA from average transfer GPA for both community college and four-year transfer students. For community college transfer students there was a drop of 0.63 grade points from the average transfer GPA to the average first-semester GPA, compared to a drop of 0.37 grade points for four-year transfer students from the average transfer GPA to the average first-semester GPA. Similarly, Author, McNerny, and Arnold (1993) found that the average GPA of community

college transfer students dropped half a grade point from the community college to the first semester at a university.

Societal analyses in the past were critical of community colleges and would have utilized the larger drop in first-semester GPA of community college transfer students as evidence against these institutions. However this study was grounded in a student-centered initial college choice-persistence nexus model that attributes the drop in first-semester GPA to the same factors that affect the initial decision to attend a community college. These factors may include delay of entry into higher education after high school, low level of educational expectations, low level of high school math, low socioeconomic status, and an occupational major (Adelman, 2005).

Additionally, first-semester GPA was found to have a positive statistically significant effect on degree attainment for both community college and four-year transfer students. Thus, for variables that had a statistically significant effect on first-semester GPA, the variable acted as a mediating variable on degree attainment.   The mediating role of first-semester GPA was more prevalent for students who transferred from four-year institutions due to the fact that besides transfer hours, first-semester GPA was the only variable to have a statistically significant effect on degree attainment. However, transfer GPA, transfer hours, completion of college algebra, and completion of freshmen English all have an indirect effect on degree attainment due to their effect on first-semester GPA and first-semester GPA's effect on degree attainment. In previous studies that did not include first-semester GPA as a mediating variable, the effects of the variables that were included in the model on degree attainment may be larger compared to the effects found in this model due to the fact that the effects on first-semester GPA in previous models were not taken into account.

The inclusion of first-semester GPA provides a measurement of academic integration during the first-semester at the receiving institution. Similar to transfer GPA and transfer hours, the positive effect of first-semester GPA on degree attainment supports previous research on baccalaureate attainment and persistence (e.g., Astin, 1975; Bean,1980; Bean & Metzner ,1985; St. John, Paulsen, & Starkey, 1996; Tinto, 1975). By including first-semester GPA as a mediating variable, this study also found that academic integration at the sending institution, or transfer hours and transfer GPA, has an effect on academic integration at the receiving institution, or first-semester GPA, for both community college and four-year transfer students. This mediating effect has rarely been included in studies on transfer student success.

Difference in Effects between Community College Transfer Students and Transfer Students from Four-Year Institutions. A summary of results for the final structural model that was utilized to test the difference of effects on degree attainment and first-semester GPA between community college transfer students and students who solely attended four-year institutions prior to transfer may be found in Table 5. The final structural model did not account for any more variance in first-semester GPA or degree attainment than the two models that were analyzed separately for the two groups of transfer students. In this study, the only effects that were found to be similar for both community college and four-year transfer students were the effect of transfer hours on first-semester GPA and the effect of transfer hours on degree attainment. For every transfer hour a student earns prior to transfer, first-semester GPA increases by 0.005 for community college and four-year transfer students. Additionally, for every transfer hour a student earns prior to transfer, he or she is 1.01 times more likely to graduate. Although it is a small amount, it is positive and statistically significant.

[Insert Table 5 here]

Previous research has investigated the differences in effects on degree attainment between community college and four-year transfer students (Koker & Hendel, 2003). Koker and Hendel (2003) found that the type of sending institution does affect degree attainment, and that community college transfers had an increased risk of noncompletion. However, this study is different in that it framed these similarities and differences in the form of college choice theory. It was a student-centered framework which assumed that the factors affecting whether a student initially chooses to attend a community college or a four-year college also affect the likelihood a student earned a baccalaureate.

Institution-centered explanations focus on the mission of the community college and its effect on degree attainment while societal analyses take a critical view of the community college and its mission to prepare students for an occupation as well as transfer (Author, McNerny, & Arnold, 1983). Other student-centered models have measured the effects of academic preparation, educational aspirations, academic integration, and social integration on persistence to graduation without couching the differences between community college transfer students and four-year transfer students in college choice theory (e.g., Koker & Hendel, 2003; Pascarella, Smart, & Ethington, 1986). By asking the question in this student-centered conceptual framework, the affect of differences between community college transfer students and four-year transfer students may be attributed to the factors that affected the initial college choice.

The student-centered approach focuses on choices made by a student, as opposed to institutional mission. In addition, just as a student's decision to remain at an institution is affected by factors such as academic and social integration, his or her decision to attend a community college or four-year institution may have been affected by certain factors. In a college choice student persistence nexus model, it is presumed that the same factors that affect

college choice also affect persistence. Whereas this study did not determine what factors

contributed to both college choice and persistence, it did show that it is likely that there are

factors that affect both college choice and persistence. The difference in effects between the

group of students who solely attended one or more community colleges and the group of students

who solely attended one or more four-year institutions supports this likelihood.

   Limitations. There are several limitations to this study. First of all it was conducted

utilizing the data from one large public, Midwestern research university. The results cannot be

generalized to all transfer students, only to those who transfer to this institution or ones like it. In

order to determine the validity of the conceptual model a national data source should be utilized

in order to provide results that can be generalized to a larger population. Another limitation is

the lack of a consistent measurement of whether a course that was transferred in was taken as a

dual-credit course. In this study, if a course was taken prior to a student's high school graduation

date, it was considered to be dual-credit. However, high school graduation date and course term

were only available for 899 of the initial 13,744 students included in the study. Thus it is likely

that there were dual-credit courses that were not marked as such and were included in the

calculation of transfer GPA.

   The large number of students who were not included in the study because they had

attended more than one type of institution prior to enrolling at MRU present another limitation.

Almost half of the original 13,744 students were not included because they attended both a

community college and a four-year institution before transferring to MRU. The effects of

transfer GPA, transfer hours, completion of college algebra and freshmen English, and first-

semester GPA on degree attainment may be quite different for this group of students. Thus the

ability to determine practical implications of this study may be somewhat limited by the fact that

the results are limited to 50% of the transfer students who matriculated to MRU.

Additionally, even for the students who did attend only one type of institution,

community college or four-year institution, prior to transferring to MRU there are differences

within these groups of institutions that were not accounted for in this study. For example, some

of the community colleges were located in urban areas while others were located in rural areas.

Taking initial college choice into consideration, there may be factors that affect whether a

student chooses to attend an urban community college over a rural community college that in

turn affects whether or not the student graduates.

In order to determine a transfer student's attendance pattern prior to attendance at MRU,

course records were reviewed and coded with type of institution attended on a course-by-course

basis. It is not possible to determine in the data whether the institution from which the course

was transferred was in fact the institution from which the course was taken, or whether the

course was taken at a previous institution and transferred to the institution reported for the

course. For example, a student may have taken a course at a community college and transferred

the course to a four-year institution. The four-year institution may be the institution that reported

the course to MRU. Thus another limitation is that the institution from which a course was taken

may be masked at times due to transferring of credit prior to attendance at MRU.   It is not

possible to determine the magnitude of this limitation.

Yet another limitation is that this study utilized a path analysis model that included both a

continuous endogenous variable, first-semester GPA, and a dichotomous endogenous variable,

degree attainment. Therefore, the effects on first-semester GPA were reported as unstandardized

linear regression coefficients while the effects on degree attainment were reported as logistic

regression coefficients. This approach limited the ability of the researcher to compare the size of

effects on first-semester GPA to the size of effects on degree attainment. Additionally, although

the researchers were able to determine if an indirect effect existed between exogenous variables

and degree attainment, it was not possible to calculate an amount for the indirect effect.

In addition, the variables in this study did not reflect the number of times the course was

taken, a factor that has been shown to affect degree attainment (Adelman, 2005). The variables

for completion of college algebra and freshmen English should include a measure for the number

of times the course was repeated prior to transfer. Nor was there an indicator of whether a

student completed an associate's degree prior to transferring to MRU. This is another limitation.

Conclusions and Implications

The results of this study suggest several directions for future research about transfer

student success. Research could include first-semester GPA as an initial measurement of

academic integration at the receiving institution. In the past, first-semester GPA has been

utilized in part to measure transfer shock; however, this study showed that it also has an effect on

degree attainment. Additionally, future research could include as a variable participation in

programs designed to assist transfer students in their transition to a new institution. For example,

the effects of participation in these programs upon first-semester GPA and degree attainment

should be researched.

For this study, dichotomous variables were utilized to measure the effects of completion

of college algebra and completion of freshmen English on first-semester GPA and degree

attainment. Future research could include a categorical variable with different levels based on

the grade earned in college algebra and freshmen English. The different levels of success may

contribute to understanding the effects of completion of college algebra and freshmen English on first-semester GPA.

Future research on transfer student success should continue to analyze the effects of prior attendance patterns of transfer students on their success after transfer to their last institution. Although this study analyzed two groups of students who solely attended a single type of institution prior to transfer, many students attend more than one type of institution in a variety of patterns. It is important to understand how these attendance patterns affect attainment of the baccalaureate.

This study did show that the factors that affect initial college choice may also affect transfer student success. Future research should focus on specific factors that have been shown to affect whether a student initially chooses to attend a community college or a four-year institution and whether these specific factors also affect baccalaureate attainment. These factors may include proximity to a community college, educational expectations, delay of entry into higher education after high school, and socioeconomic status.

The findings of this study also have major implications for institutional policy. First, critical views of community colleges should be tempered with the knowledge that transfer student success is affected by factors that affect initial college choice.   Enrollment managers, administrators, and faculty members at four-year receiving institutions may have a critical view of community colleges. This perception may affect transfer student admission requirements or the treatment of community college transfer students and representatives. If transfer student success is valued, the factors that affect initial college choice should be targeted as avenues to assist transfer students at the receiving institution. Transfer student success may be positively

affected by utilizing a more student-centered approach to recruitment and retention of transfer students, whether from two-year or four-year institutions.

Lastly, the importance of a transfer student's first-semester performance at the receiving institution should be considered. First-semester GPA was one of the strongest predictors of degree attainment. For every one-tenth grade point increase in first-semester GPA, a community college transfer student was 1.11 times as likely to graduate while a four-year transfer student was 1.10 times as likely to graduate. Although completion of college algebra and completion of freshman English had a larger effect these variables were based on a dichotomous variable, as compared to first-semester GPA, which was based on a continuous variable measuring first-semester GPA in one-tenth increments. Practically speaking, academic advisors at both sending and receiving institutions should educate transfer students on support services available to students as well as encourage transfer students to seek assistance when necessary.

In conclusion, transfer student success is determined in part by experiences at previous institutions as well as experiences at the final receiving institution. The first-semester at the new institution is a crucial period in the transition process. Receiving institutions should be cognizant of this and simplify the transition process as much as possible for transfer students. The receiving institutions should continue to support initiatives in place to support a smooth transition for transfer students during their first-semester.

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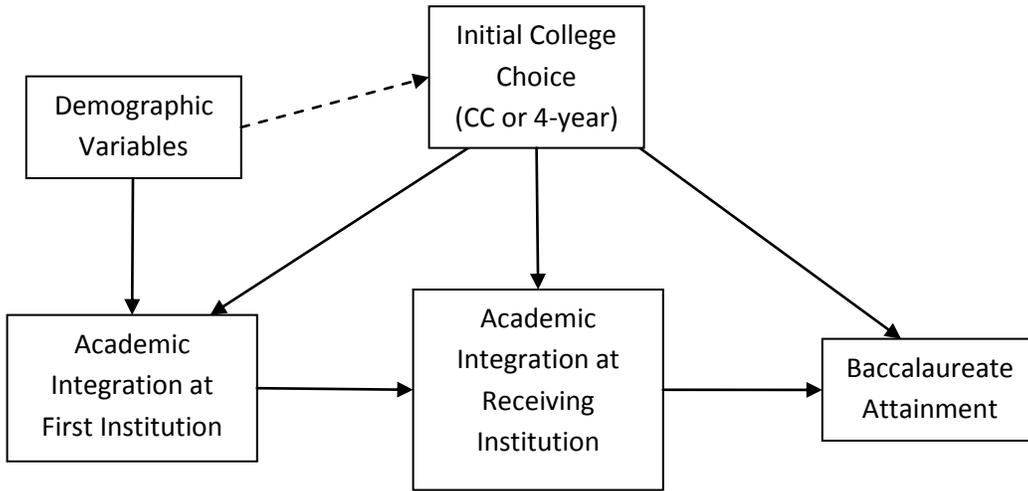
Figure 1. Conceptual Model

Table 1.

Student Demographic Variables by Type of Attendance: Percent (Counts)

Demographic variables	Community college	Four-year college	Total	X^2
Size of Population	N = 3,634	N = 2,322	N = 5,956	
Gender				
Male	59% (2,136)	51% (1,194)	56% (3,330)	31.08*
Female	41% (1,498)	49% (1,128)	44% (2,626)	
Ethnicity				
White, Non-minority	85% (3,097)	86% (1,991)	85% (5,088)	0.46
Minority	11% (391)	10% (237)	11% (628)	
Unknown	4% (146)	4% (94)	4% (240)	
Pell Grant Status				
Awarded Pell	35% (1, 271)	29% (682)	33% (1,953)	20.19*
Not Awarded Pell	65% (2,363)	71% (1,640)	67% (4,003)	
Discipline of Study				
STEM field	10% (361)	12% (290)	11% (651)	9.61*
Non-STEM field	67% (2434)	65% (1,503)	66% (3,937)	
Undeclared	23% (839)	23% (529)	23% (1,368)	
Semester Enrolled				
Fall	79% (2,880)	75% (1,734)	77% (4,614)	16.98*
Winter or Summer	21% (754)	25% (588)	23% (1,342)	

Enrollment Status				
Full-time	70% (2,558)	73% (1,691)	71% (4,249)	4.11*
Part-time	30% (1,076)	27% (631)	29% (1,707)	
Age				
Traditional-age	85% (3,080)	88% (2,035)	86% (5,115)	9.72*
Nontraditional-age	15% (554)	12% (287)	14% (841)	

*$p < 0.05$

Table 2.

Entering Academic Ability Variables and Graduation Rate by Type of Attendance

Entering academic ability variables	Community college	Four-year college	Total	X^2	ANOVA, F
Size of Population	N = 3,634	N = 2,322	N = 5,956		
Transfer GPA	2.96	2.95	2.95		0.08
Transfer Hours	53.53	52.68	53.19		1.71
College Algebra					
Completed	49%	38%	45%	69.39*	
Did Not Complete	51%	62%	55%		
Freshmen English					
Completed	71%	73%	72%	1.39	
Did Not Complete	29%	27%	28%		
First Semester GPA	2.33	2.58	2.42		93.60*
Graduation Rate					
Baccalaureate					
Degree	50%	59%	54%	49.42*	
No Degree	50%	41%	46%		

*$p < 0.05$

Table 3.

Summary of Linear Regression and Logistic Regression Coefficients for Community College Transfer Students

Variables	β	Log β	Odds ratio
Onto 1st semester GPA			
Intercept	-3.97*		
Transfer GPA	0.85*		
Transfer hours	0.04*		
College algebra	-0.53		
Freshman English	-0.75*		
R^2	0.24		
Onto degree attainment			
Threshold		5.55*	
1st semester GPA		0.11*	1.11
Transfer GPA		0.02*	1.02
Transfer hours		0.01*	1.01
College algebra		0.16	1.17
Freshman English		0.41*	1.51
Pseudo R^2	0.32		

$* \, p < 0.05$

Table 4.

Summary of Linear Regression and Logistic Regression Coefficients for Four-Year Transfer Students

Variables	β	Log β	Odds ratio
Onto 1st semester GPA			
Intercept	-0.49		
Transfer GPA	0.82*		
Transfer hours	0.06*		
College algebra	-1.33*		
Freshman English	-1.02*		
R^2	0.23		
Onto degree attainment			
Threshold		4.10*	
1st semester GPA		0.10*	1.10
Transfer GPA		0.02	1.02
Transfer hours		-0.01	0.99
College algebra		0.01	1.00
Freshman English		0.16	1.17
Pseudo R^2	0.28		

$* \, p < 0.05$

Table 5.

Summary of Linear Regression and Logistic Regression Coefficients for Two-Group Model

Variables	Community college			Four-year college		
	β	Log β	Odds ratio	β	Log β	Odds ratio
Onto 1st semester GPA						
Intercept	-3.97*			-0.49		
Transfer GPA	0.85*			0.82*		
Transfer hours	0.04*			0.06*		
College algebra	-0.53			-1.33*		
Freshman English	-0.75			-1.02*		
R^2	0.23			0.24		
Onto degree attainment						
Threshold		5.25*			4.48*	
1st semester GPA		0.11*	1.11		0.10*	1.10
Transfer GPA		0.02*	1.02		0.02	1.02
Transfer hours		0.01*	1.01		0.01*	1.00
College algebra		0.19*	1.21		0.01	1.00
Freshman English		0.44*	1.55		0.15	1.17
Pseudo R^2	0.32				0.27	

$* \, p < 0.05$