Application of Investment Theory to Predicting Maintenance of the Intent to Stay among

Freshmen

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Abstract

Recently, it has been suggested that constructs from different disciplines should be incorporated into Tinto's (1993) sociological model of the determinants of departure from college (Ackerman & Schibrowsky, 2007). We tested the hypothesis that variables derived from Rusbult's (1983) social-psychological investment theory contribute, above and beyond variables derived from Tinto's model, to the prediction of maintaining the intent to stay at a university. A sample of 218 first-semester freshmen at a large southwestern university who indicated at the beginning of the fall 2007 semester that they intended to stay subsequently completed a questionnaire assessing integration variables (goal commitment, social integration, and academic integration), investment variables (satisfaction level, investment size, and quality of alternatives), and college graduation intention (stay versus transfer). A binary logistic regression analysis revealed that two variables derived from investment theory--satisfaction level and quality of alternatives—affected the log odds of students maintaining their intent to stay.

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Hermanowicz (2006-2007) noted that transferring runs counter to both individual and university expectations. He pointed out that the vast majority of students do not enter a university with the expectation of transferring and that universities do not admit students with the expectation that they will leave without a degree. Nevertheless, transferring is a very prevalent and important form of institutional departure. It has been estimated that over 40% of students who initially enroll at a 4-year college or university transfer to another institution prior to earning their baccalaureate degree (McCormick & Carroll, 1997). Furthermore, students who attend only one 4-year institution are more likely to persist and to obtain a bachelor's degree than students who transfer to another institution (McCormick, 2002).

In support of Hemanowitz's (2006-2007) contention, Okun Karoly, Martin, and Benshoff (2008-2009) recently demonstrated that only 8% of freshmen entered a university with the intent to transfer. By the 12th week of their first semester, an additional 16% of the freshmen in their sample indicated that they had switched their intention to transferring and graduating from another college or university. Students who entered the University with the intent to transfer (exogenous intent-to-transfer students) were significantly ($p < .05$) higher than students whose intent to transfer emerged following enrollment at the University (endogenous intent-to-transfer students) on academic integration, social integration, and institutional commitment but the two groups of students did not differ with respect to goal commitment.

Research on factors associated with staying at, versus transferring from, a university has often been guided by Tinto's sociological model (Tinto, 1975; 1993). According to Tinto, attrition involves a process in which background variables influence students' intentions and

commitments to goals and the institution. Initial intentions and commitments are the precursors

of the types of interactions that students have in the academic and social spheres of the college

environment. These interactions, in turn, are conceived of as the primary determinants of

whether students become academically and socially integrated into the college or university.

Academic and social integration, in conjunction with external commitments, are proposed to

influence changes in students' intentions and commitments to their goals and the institution.

Changes in intentions, goal commitment, and institutional commitment are viewed as being the

most proximal determinants of college student departure.

Despite the extensive contribution that Tinto's sociological theory (hereafter referred to

as the *integration* framework) has made to our understanding of the dynamics of student transfer

(e.g., Pascarella, Duby, & Iverson, 1983; Mallette & Cabrera, 1991), Tinto (2006-2007) and

others (Ackerman & Schibrowsky, 2007; Braxton, 2000) have acknowledged the need to

incorporate constructs from other disciplines that can potentially illuminate the process

underlying college student departure. In the present study, we examined whether variables

derived from Tinto's model and from investment theory (a social-psychological theory; Rusbult,

1983) distinguish between students who maintain their intent to persist and students who shift

their intent from persisting to transferring (i.e., endogenous intent-to-transfer students).

<u>Investment Theory</u>

Initially, investment theory was developed to study the maintenance versus dissolution of

close interpersonal relationships (Rusbult, 1980a; Rusbult, 1980b). According to this theory,

there are three determinants of commitment—satisfaction level, investment size, and quality of

alternatives. Commitment, in turn, is posited to mediate the effects of level of satisfaction,

investment size, and quality of alternatives on maintenance versus dissolution of the relationship.

Commitment has been characterized by an intention to remain in a relationship, a psychological attachment to a partner, and a long-term orientation toward the partnership (Rusbult & Buunk, 1993). Satisfaction level is defined as the subjective evaluation of the relative positivity or negativity that a person experiences in a relationship (Arriaga & Agnew, 2001). Investment size refers to resources attached to the partnership that would be lost or seriously diminished upon dissolution of the relationship. Investment include both intrinsic resources (e.g., time and effort, experienced emotions, and the importance that the relationship has for one's identity (Rusbult, 1980a) and extrinsic resources (e.g., social network, social status, and material benefits) that a person has built up in a romantic relationship (Rusbult, Drigotas, & Verette, 1994). Quality of alternatives involves a comparison of actual outcomes derived from a current partner with the potential outcomes derived from the best alternative (Rusbult, 1980b).

Le and Agnew (2003) conducted a meta-analysis of applications of investment theory to dating relationships and to other contexts including work, academics, and recreational activities. Across 39 to 41 studies, for romantic relationships the average weighted (by sample size) correlation between (a) satisfaction level and commitment was .71, (b) investment size and commitment was .48, and (c) quality of alternatives and commitment was -.52. In concert, on average, the three variables accounted for 63 percent of the variance in commitment. Furthermore, across 12 studies, 10 of which focused personal relationships, the weighted mean correlation between commitment level and stay-leave behavior was .47.

Although investment theory was developed to explain the maintenance versus dissolution of romantic relationships, several researchers subsequently applied this framework to work organizations. Although the relations between satisfaction level, investment size, and quality of alternatives and commitment were not as strong in this context as compared to the personal

relationship context, they remained significant. More specifically, across 5 to 6 studies, for job-related contexts, the average weighted correlation between (a) satisfaction level and commitment was .51, (b) investment size and commitment was .34, and (c) quality of alternatives and commitment was -.26.

Le and Agnew (2003) also identified between 2 and 4 studies that examined the associations between investment-related variables and commitment in academic, club, and sport contexts. The average weighted correlations for the relations between satisfaction level and commitment (.31) and investment size and commitment (.43) were significant but the association between quality of alternatives and commitment (-.06) was not significant. Because this set of studies mixed academic, club, sport contexts, ahead we review three studies that applied investment theory to college outcomes.

Applications pertaining to college. In the first study, Kluger and Koslowsky (1988) administered investment-related measures two weeks prior to the end of the semester and collected data on calculus course grade and semester GPA. Investment size and the rewards component of satisfaction level were strongly related to commitment but quality of alternative was not. Investment size, the reward and cost components of satisfaction level, and commitment were positively related to both calculus course grade and semester GPA. Perhaps, quality of alternatives for the calculus course was not a significant correlate of commitment or grades because it was assessed at a point in the semester (two weeks from the end) when other options such as dropping the course and enrolling in another course were no longer viable.

Okun, Ruehlman, and Karoly (1991) examined the utility of investment theory for predicting the enrollment intention and departure behavior of part-time community college students. They distinguished among students who intended to persist, to transfer, and to stop out.

Students who intended to transfer had higher quality of alternatives scores than students who intended to persist and to stop out. Students who intended to stop out had lower satisfaction level scores than students who intended to persist and to transfer. Compared to students who departed, students who persisted had higher satisfaction level and higher investment size scores.

Hatcher, Kryter, Prus, and Fitzgerald (1992) examined the contribution of variables derived from investment theory and integration theory (graduation commitment, academic development, interactions with faculty, interaction with peers, and cumulative GPA) to predicting institutional commitment and persistence in a sample of freshmen, sophomores and juniors. In these models, background variables (sex, race, high school class rank, and total SAT scores) were used as control variables. The results indicated that controlling for the background variables and the investment variables, the integration predictors accounted for only 1% of the variance in institutional commitment. In contrast, controlling for the background variables and the integration variables, the investment predictors accounted for an additional 36% of the variance in institutional commitment. A series of discriminant function analyses with persistence/departure as the group membership variable indicated that (a) the background variables accounted for four percent of the variance; (b) the background and integration variables together accounted for seven percent of the variance, $p > .05$; and (c) the background and investment variables together explained 22 percent of the variance, $p < .001$. Thus, relative to the integration variables, the investment variables were much better predictors of institutional commitment and exhibited stronger associations with persistence/departure behavior. Hatcher et al. (1992, p.1295) concluded: "On balance, the current results show that the investment model holds much promise as an approach for the study of college student attrition."

The Relation between Institution Commitment and College Graduation Intention

We maintain that institutional commitment and college graduation intention are not distinct concepts and that they often are assessed using similar measures. Conceptually, in the context of applications of investment theory to close interpersonal relationships, Le and Agnew (2003, p. 37) stated: "the term *commitment* is often used to describe the likelihood that an involvement will persist.*"* Similarly, in the context of college persistence research, intentions have been defined as students' expectations regarding whether they will return to the same college (Metzner, 1989). Items that have been used to assess institutional commitment (Pascarella & Terenzini, 1983) and enrollment intention (Metzner, 1989) include "It is likely that I will register at _____ next fall" (institutional commitment) and "Do you expect to return to this school next semester?" (enrollment intention). In light of the overlap between institutional commitment and enrollment intention (Bean & Metzner, 1985), we did not include institutional commitment as a predictor of maintenance versus decay of the intent to persist. Instead, we used our measure of institutional commitment to validate our measure of college graduation intention.

The Hypothesis of the Present Study

In the present study, college graduation intention (and institutional commitment) was measured twice—two weeks into the fall 2007 semester and 6 or more weeks later in the same semester. In addition, the core variables derived from Tinto's (1993) integration model (academic integration, social integration, and goal commitment) and the core variables derived from Rusbult's (1983) investment model (investment size, satisfaction level and quality of alternatives) were measured at the second measurement occasion. We used the integration and investment variables to predict college graduation intention (transfer or stay) at time 2 in a sample of first-semester freshmen who initially indicated that they intended to persist. Based upon previous research (Hatcher et al., 1992), we hypothesized that, controlling for the

integration variables, the investment variables will enhance the fit of the model to the data.

Method

The University

The southwestern University in which the students in the present study were enrolled is one of the fastest growing multi-campus universities in the United States. The campus where the study was conducted has the nation's second largest single-campus combined enrollment of undergraduate (41,256) and graduate (10,356) students. According to the Carnegie classification system, the University is a Research I institution. The attrition rate for students from the first year to the second year in 2005 was 21.5 percent.

The Sample

For two reasons, we chose to draw our sample from students enrolled in sections of Introduction to Psychology. First, this course is populated with freshmen who have diverse majors (only 5% of the students enrolled in the course are psychology majors). Thus, freshmen enrolled in Introduction to Psychology represent a good cross-section of the freshmen cohort. Second, this course provides a mechanism for efficiently screening students for inclusion in our sample. Students enrolled in Introduction to Psychology are able to fulfill a course requirement by participating in research studies that they select from a menu. To facilitate their participation in research projects, students complete a variety of questionnaires submitted by researchers during the second week of the semester. Students are not given any preliminary overview of the studies that they will have the opportunity to participate in later in the semester. This is done to avoid the possibility that this information might bias their answers to the questions on the battery.

Embedded in the battery were seven questions germane to the present study. Students

completed three items that were used to screen for eligibility in the present study and four items

that assessed initial institutional commitment. In addition, students provided their names and e-

mail addresses. Eligible students were invited to participate in the study via e-mail.

To be eligible for the present study, students had to: (a) be a freshman, (b) be attending

the University for the first time, and (c) have the intention of staying at the University until

graduation. Of the 1507 students who were eligible for the study, 218 students chose to

participate between the 8th week and the end of the fall 2007 semester. The study was conducted

on campus in a laboratory which had partitions to separate students. The number of participants

in a testing session ranged from one to six. When each participant arrived for the study, he or

she read and signed an informed consent form. After signing the informed consent form,

participants completed a worksheet and a questionnaire. Then, participants were debriefed.

Twenty students were excluded from the analyses because of missing data on one or

more of the main study variables. Thus, the final sample consisted of 198 students. The majority

of the students were women (51%). The participants ranged in age from 17 to 24 years old, with

the bulk of the students being 18 or 19 years old. The ethnicity of the sample was predominantly

Caucasian (70.6%) with the next most common ethnicity being Hispanic (18.8%). The majority

of the students were in-state residents (58.6%).

Measures

College graduation intention. Participants were asked, "Does you plan for college

involve the intention to graduate from the University, to transfer and graduate from another

college or university, or not graduate from the University or from another college or university?"

The response options included: "I intend to graduate from the University", "I intend to transfer

and graduate from another university", and "I intend not to graduate from the University or from

another college or University". As noted earlier, students who participated in the study indicated

on the battery of measures that they intended to stay and graduate from the University.

Institutional and goal commitment. Okun et al. (2008-2009) developed brief measures of

institutional and goal commitment from an initial pool of 16 items that came from the

Institutional and Goal Commitment subscale of the Institutional Integration Scale (Pascarella &

Terenzini, 1983) and the Attachment subscale of the College Adjustment Questionnaire (Baker

& Siryk, 1986). Using exploratory factor analysis, they found support for a two-factor solution

and labeled the factors institutional commitment and goal commitment. A sample institutional

commitment item was, "I am pleased now about my decision to attend _____ in particular." A

sample goal commitment item was, "I am pleased now about my decision to go to college." They

reported coefficient alphas for the four-item institutional commitment scale of .79 and .88 and

coefficient alphas for the three-item goal commitment scale of .70 and .63. Students rated these

items on a 5-point scale with anchor points of "doesn't apply to me at all" (0) and "applies to me

a great deal" (4). Scores on the institutional commitment scale were formed by averaging the

ratings on the four items and scores on the goal commitment scale were formed by averaging the

ratings on the three items. The institutional commitment scale was included both in the initial

battery of measures and in the study questionnaire.

Social and academic integration. The brief social and academic integration scales were

developed by Okun et al. (2008-2009) from an initial pool of 24 items that came from the

Institutional Integration Scale (Pascarella & Terenzini, 1983). In an exploratory factor analysis,

they found support for a two-factor solution and they labeled the factors social integration and

academic integration.

A sample social integration item was, "Since coming to _____, I have developed close,

personal relationships with other students." A sample academic integration item was, I am

satisfied with the opportunities to meet and interact informally with faculty members." It should

be noted that these scales assess perceptions of the informal aspects of social and academic

integration. They reported coefficient alphas for the five-item social integration scale of .85 and

.87 and coefficient alphas for the four-item academic integration scale of 82 and .76. Students

rated these items on a 5-point scale with anchor points of "strongly disagree" (0) and "strongly

agree" (4). Scores on the social integration scale were formed by averaging the ratings on the

five items and scores on the academic integration scale were formed by averaging the ratings on

the four items.

Quality of alternatives. Students were asked to identify in writing the university or

college they would be most likely to attend if they were not enrolled at the University. The

university or college identified was labeled the "alternative college." Participants then rated the

alternative college in comparison to the University on five dimensions: quality of education,

working conditions, social life, recognition, and compensation (Betz, Klingensmith, & Menne,

1970). Students read a brief description of each dimension before rating it. Then, students

answered the following question, "In comparison to _____, how would you rate the alternative

college on _____?" The responses to the quality of alternatives questions were

rated a 5-point scale with anchor points of (1) "The alternative college is much worse than the

University" and (5) "The alternative college is much better than the University".   Scores on the

quality of alternative scale were formed by averaging the ratings on the five items.

Satisfaction level. The measure of college satisfaction also was developed for this study.

Based upon the distinction made by Tinto (1975) between the academic and social domains of

the college experience, participants then indicated whether their academic experiences and their

social experiences at the University were satisfying. The response options for the two items were (0) "True" and (1) "False". Satisfaction level scores were formed, after reverse-coding the two items, by averaging them.

　　　Investment size. Investment size was measured with two items pertaining to credit load and course load for the semester. For the question on semester credit load, the response options were coded as follows: 1-3 credit hours = 0, 4-6 credit hours = 1, 7-9 credit hours = 2, 10-12 credit hours = 3, 13-15 credit hours = 4, and 16+ credit hours = 5. For the question on semester course load, the response options were coded as follows: one class = 0, two classes = 1, three classes = 2, four classes = 3, five classes = 4, and six or more classes = 5. The mean and standard deviation for semester credit hours were 4.13 and 0.82, respectively whereas the mean and standard deviation for number of courses taken this semester were 4.23 and 0.78, respectively. To create an investment size score, the raw scores on each item were converted to z scores and then the two z scores were averaged. These investment size scores were used in all subsequent analyses.

<div align="center">Results</div>

Descriptive Analyses

　　　We (a) compared the sample of students in the present study with the eligible pool of students, (b) determined whether the students in the sample who were included in the analyses differed from those who were excluded from the analyses, (c) estimated the reliability of the scales, (d) presented descriptive statistics on the main study variables, (e) examined the correlations among the main study variables, and (f) provided evidence regarding the validity of our measure of college graduation intention.

　　　Comparison of students in the sample with the eligible pool of students. Comparisons of

the students in the sample with the eligible pool of students with respect to age, race, sex, and initial institutional commitment scores using χ^2 and t tests revealed no significant differences, lowest $p > .12$. With respect to the four variables examined, the students included in the present study appear to be representative of the population of students who were eligible to participate in the present study.

Comparison of students included and excluded from the analyses. Comparisons of the students included in the analyses with those excluded from the analyses due to missing data on satisfaction level, quality of alternatives, investment size, social integration, academic integration, goal commitment, institutional commitment at time one, institutional commitment at time two, and college graduation intention at time 2 using t and χ^2 tests yielded no significant differences, lowest $p > .15$.

Estimates of the reliability of the scales. The internal consistency reliability estimates for the multi-item scales are reported in Table 1. The coefficient alphas ranged from .62 (quality of

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Insert Table 1 about here

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alternatives) to .91 (social integration). Given the relatively small number of items on these scales, the internal consistency reliability of the scales appears to be satisfactory. Number of courses is moderately related to number of credit hours ($r = .47$) whereas there was only a modest association between student's ratings of satisfaction with their academic and social life ($\varphi = .20$).

Descriptive statistics for the main study variables. The means and standard deviations for the main study variables are presented in Table 1. Overall, students were neither dissatisfied nor

satisfied with the University. By and large, students rated the alternative college or university as comparable to the University they were currently attending. In general, students' ratings of social integration were higher than their ratings of academic integration. Overall, students were highly committed to attaining a college degree. At time 2, none of the students indicated that they intended to drop out. Eighty-nine percent of the students indicated that they intended to stay and 11% of the students indicated that they intended to transfer.

Correlations among the main study variables. The correlations among the predictor variables are presented in Table 2. Social integration was most strongly related to satisfaction

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Insert Table 2 about here

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level ($r = .35$), goal commitment ($r = .24$), and academic integration ($r = .21$). In addition, academic integration was positively correlated with satisfaction level ($r = .16$).

Validating the measure of college graduation intention. The internal consistency reliability estimates for institutional commitment were .79 and .86 at time 1 and at time 2, respectively. To validate our measure of college graduation intention, we carried out a mixed 2 x 2 analysis of variance (ANOVA) on the institutional commitment scores. The between-subjects factor was College Graduation Intention at time 2 (Transfer versus Persist) and the within-subjects factor was Occasion (Time 1 versus Time 2). We expected to find that, relative to students who maintained their intention to persist, students who switched their intention from persisting to transferring would exhibit a significantly larger decline in their institutional commitment scores.

College Graduation Intention had a significant main effect on institutional commitment

scores, $F(1,196) = 54.58, p < .001$. Occasion also had a significant effect on institutional

commitment scores, $F(1,196) = 54.76, p < .001$. These main effects were qualified by a

significant College Graduation Intention by Occasion interaction effect on institutional

commitment scores, $F(1,196) = 33.32, p < .001$. To probe the interaction effect, dependent and

independent sample t-tests were computed. For students who intended to persist at time 2,

institutional commitment scores declined over time from 3.51 to 3.35, $t(175) = -2.72, p < .01$.

For students who intended to transfer at time 2, institutional commitment scores declined over

time from 3.20 to 1.90, $t(21) = -4.30, p < .001$. Because of differences in sample sizes and

variances, we adjusted the independent samples t test on institutional commitment difference

scores. As expected, institutional commitment difference scores (time 2 minus time 1) showed a

greater decline among students who intended to transfer at time 2 (-1.30) as compared to students

who intended to persist at time 2 (-0.16), $t(22.62) = 3.70, p < .002$.

Inferential Analyses

In this section, we used (a) independent samples t tests to examine whether there were

significant bivariate associations between college graduation intention at time 2 and the predictor

variables; and (b) binary logistic regression to test our hypothesis that investment variables,

above and beyond integration variables, significantly enhance the fit of the model to the data.

Bivariate relations between the predictors and college graduation intention at time 2. As

can be seen in Table 3, none of the integration variables were significantly related to college

graduation intention at time 2. Among the investment variables, the association between

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Insert Table 3 about here

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satisfaction level and college graduation intention at time 2 approached statistical significance, t (22.61) = 2.05, p < .06), and the association between quality of alternatives and college graduation intention at time 2 was significant, t (196) = -4.85, p < .001.

Prediction of college graduation intention at time 2. In our analysis, the "response" category, intent to stay was coded 1 and the "reference" category, intent to transfer, was coded 0. Binary logistic regression uses maximum likelihood estimation after transforming the dependent variable into the log odds of the category coded 1 (Tabachnick & Fidell, 1996). In the present analysis, we used a block-entry technique. In block 0, only the intercept was included in the model. This model is also known as the null or baseline model. In block 1, the integration variables were added to the model and in block 2, the investment variables were included in the model. At each block, the log of the probability that the observed values of the dependent variable may be predicted from the observed values of the predictors is generated. When this statistic is converted to the -2 log likelihood (-2LL) statistic, it can be used to compare the block 0 model with subsequent models.

Table 4 summarizes the binary logistic regression model used to predict college graduation intention at time 2. In the intercept-only model (block 0), the value of the -2LL

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Insert Table 4 about here

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statistic was 138.13. The percentage of students correctly classified with respect to college graduation intention at time 2 is simply 100 times the proportion of students who intend to persist at time 2 (100 x [176/198] = 88.9%.

In block 1, the three integration variables were entered into the model. To evaluate

whether these predictors as a set enhance the fit of the model to the data, the -2LL statistic

associated with block 1 (137.00) was subtracted from the -2LL statistic associated with block 0

(138.13). The difference in the -2LL statistic can be tested for significance using the χ^2 sampling

distribution with degrees of freedom equal to the number of predictors entered in the block.

Thus, compared to the null model, the improvement in fit associated with including the three

integration variables was not significant, $\chi^2 = (198, 3) = 1.13$, $p = .77$. One index of strength of

association is the Nagelkerke (pseudo) R^2 which compares the log likelihood of the model tested

against the log likelihood of the baseline model adjusting for its maximum possible value. This

measure can range from .00 to 1.00. In the present study, the value of the Nagelkerke (pseudo)

R^2 associated with the integration predictors was only .01. Furthermore, the classification

accuracy of the model including the integration variables was the same as under the null model

(88.9% hit rate).

In block 2, the three investment variables were entered into the model. With all six

predictors in the model, the -2LL statistic was 107.08. The reduction in the -2LL statistic relative

to the null model was significant, $\chi^2 = (198, 6) = 31.05$, $p < .001$. To test our hypothesis, we

compared the model that contained the integration variables (block 1) with the full model that

contained both the integration and investment variables (block 2). Consistent with our

hypothesis, inclusion of the investment variables significantly reduced the -2LL statistic, $\chi^2 =$

$(198, 3) = 29.92$, $p < .001$. The classification accuracy of the full model was 91.9%. Thus,

relative to the null model and the model that included the integration variables (88.9% hit rate),

using the full model yielded a 3.0% gain in prediction accuracy and this represents 27% of the

possible improvement, ([3/11.1] x 100). The Nagelkerke (pseudo) R^2 value associated with the

full model was .29, which represents an increase of .28 over the model that included only the integration variables.

Table 4 also provides information regarding the contribution of the individual predictors. The bs represent unstandardized logistic regression coefficients and they the indicate the magnitude and direction of the relation between each predictor and the log odds of students intending to stay at time 2, controlling for the other predictors. Positive values for b indicate that as scores on the predictor increase, the log odds of students intending to stay at time 2 increases whereas negative values for b indicate that as scores on the predictor increase, the log odds of students intending to stay at time 2 decreases. The Wald statistic represents the square of the ratio of the b to its standard error $(SE\ b)$. This statistic can be tested for significance using the χ^2 sampling distribution with degrees of freedom equal to 1. As can be seen in Table 4, none of the integration variables were significant predictors at block 1 or at block 2. Among the investment variables, satisfaction level ($b = 2.30$) and quality of alternatives ($b = -2.29$) were significant ($p <$ .05) predictors of college graduation intention at time 2. As satisfaction level scores increase, the log odds of students intending to stay at time 2 increases whereas as quality of alternatives scores increase, the log odds of students intending to stay at time 2 decreases.

The odds ratio (e^b) is the natural log base, e, to the exponent, b. When the predictor increases the log odds of students intending to stay at time 2, the odds ratio will be greater than 1. In contrast, when the predictor decreases the log odds of students intending to stay time 2, the odds ratio will be less than 1. The odds ratio represents the increase (or decrease if the ratio is less than 1) in the odds of intending to stay when the value of the predictor increases by one unit. For example, controlling for the other predictors, the estimated odds of intending to stay are almost 10 times greater for a student with a satisfaction level score of 1 as compared to 0.

Conversely, for example, controlling for the other predictors, the estimated odds of intending to stay are almost 10 times less for a students with a quality of alternative score of 3 as compared to 2.

Post hoc Analyses

In light of the finding that quality of alternatives was the strongest predictor of college graduation intention at time 2, we examined which of the dimensions of quality of alternatives contributed independently to distinguishing between student who intended to persist and students who intended to transfer at time 2. This was done by carrying out a logistic regression analysis in which college graduation intention at time 2 was predicted from the ratings of the five dimensions of quality of alternatives. The Wald statistic was significant ($p < .05$) for three of the quality of alternative dimensions--social life, $\chi^2 = (198, 1) = 6.22$, quality of education, $\chi^2 = (198, 1) = 4.91$, and compensation, $\chi^2 = (198, 1) = 3.93$.

Discussion

Tinto (2006-2007), the architect of the integration model of student departure, called for the expansion of his sociological model by incorporating constructs from models of departure that are rooted in other disciplines. The goal of the present study was to test the hypothesis that the social-psychological variables derived from Rusbult's (1983) investment model would contribute, above and beyond the variables derived from Tinto's model, to the prediction of maintenance versus decay of the intent to persist.

The Relative Utility of the Integration and Investment Models

Unexpectedly, the integration variables accounted for approximately 1% of the variance in college graduation intention at time 2. In contrast, controlling for the integration variables, the investment variables explained approximately 28% of the variance in college graduation at time

2. In the present study, 11% of the students were endogenous intent-to-transfer students and 89% maintained their intention to persist at the university. In light of the high base rate for maintaining the intent to persist, there was not much room for the prediction model to enhance the hit rate for classifying students' college graduation intention at time 2. Nevertheless, the investment variables did improve the hit rate by three percent. The hit rate was strikingly higher for the group that maintained the intent to persist (99.4%) than for the group that shifted their intention from persisting to transferring (31.8%). Thus, improvement of the prediction model will require incorporating additional variables that help to accurately identify endogenous intent-to-transfer students. It is possible that events external to the college environment contribute to the decay of the intent to persist. For example, due to economic and family events, parents may encourage their children to transfer to another college or university.

It is not surprising that endogenous intent-to-transfer students are similar to intent-to-persist students with respect to goal commitment because the former group is not abandoning their goal of obtaining a college degree. However, it is not clear why endogenous intent-to-transfer students and intent-to-persist students did not differ in their informal academic and social integration scores. Our validity check established that the two groups differed substantially with respect to changes in institutional commitment and in previous research significant differences were observed between the two groups on the measures of informal academic and social integration used in the present study (Okun et al., 2008-2009). Possibly the discrepancy in the findings is due to differences in how change in college graduation intention was measured in the two studies. On the one hand, in the Okun et al. study, students made retrospective assessments of whether their college graduation intention had changed from earlier in the semester. On the other hand, in the present study, intent to persist was measured twice and only

students who indicated that they intended to persist at the first measurement occasion were eligible for inclusion in the study.

The Contribution of the Individual Variables Derived from Investment Theory

   Investment size. Among the three variables derived from investment theory, only investment size was not a significant predictor of college graduation intention at time 2. In Le and Agnew's (2003) meta-analysis investment size was found to be positively related to commitment in studies of participation in sports, clubs, and academics. Kluger and Koslowsky (1988) found that investment size was strongly related to GPA and Hatcher et al. (1992) observed that investment size was a significant predictor of institutional commitment. In contrast, in the Okun et al. (1991) study, investment size did not differentiate among community students who intend to transfer, to stop our, and to persist. Rusbult and Farrell (1983) demonstrated that investment predicted job commitment only among employees who had been with the firm for some time. Therefore, it may be the case that the longer students attend a university, the greater the likelihood that investment size, in the form of number of credit hours and courses taken, serves as a deterrent to the decay of the intent to persist. Alternatively, it may be the case that credit hours earned and courses completed are not the most important resources lost by students if they chose to leave a university and transfer elsewhere. Perhaps, other types of losses associated with leaving a university (e.g., social network) contribute more to the prediction of college outcomes.

   Satisfaction level. In the present study, satisfaction level was positively related to maintaining the intent to stay. A robust finding from research applying investment theory to close interpersonal relationships is that satisfaction level is the strongest predictor of commitment (Le & Agnew, 2003). However, the findings of studies applying investment theory

to sports, clubs, and academics indicated that although the relation remained significant, the

magnitude of the association was not as strong. In studies of college students, satisfaction level

has been shown to predict GPA (Kluger & Koslowsky, 1988), institutional commitment (Hatcher

et al., 1992), and intent to transfer (Okun et al., 1991). Satisfaction level can be thought of as a

"centripetal force" that serves to bind students to their university.

Quality of alternatives. In the present study, quality of alternatives was inversely related

to maintaining the intent to stay. In contrast, Le and Agnew (2003) did not observe a significant

relation between quality of alternatives and commitment in sport, club, and academics contexts.

In studies of college students, quality of alternatives was found to be correlated with GPA

(Kluger & Koslowsky, 1988), to predict institutional commitment (Hatcher et al., 1992), and to

differentiate between students who intend to transfer versus stay and stop out (Okun et al., 1991).

Quality of alternatives can be conceived of as a "centrifugal force" that acts to pull students away

from the university.

Limitations

The present study has several limitations. First, several measures of predictors in the

present study were brief (e.g., college satisfaction) and the magnitude of the effects observed in

the present study might be stronger if the scales used to measure the constructs included more

items. Second, it is not possible in the present study to distinguish between true change in the

intent to persist and change due to lack of test-retest reliability for the measure of college

graduation intention. However, it should be noted that, relative to students who maintained their

intent to persist, students who switched their intention from persisting to transferring showed a

much greater decline in institutional commitment from time 1 to time 2. Third, because the

present study was conducted at one university, the external validity of the findings is not

established. Finally, causal inferences regarding the relations between the predictors and maintenance versus decay of the intent to persist are not warranted.

Directions for Future Research

As Hatcher et al. (1992) note, there is considerable conceptual overlap between the academic and social integration constructs in Tinto's model and the satisfaction level construct in Rusbult and Farrell's (1983) model. In contrast, the quality of alternatives construct clearly is distinct from the constructs included in Tinto's model. We found that the estimated odds of a student switching his or her intention from staying to transferring, controlling for the other predictors, are almost 10 times greater for a student who relative to his or her peer, is one-point higher on the Quality of Alternatives scale. This finding indicates that quality of alternatives is a promising construct that should be incorporated into subsequent models of the determinants of student transfer behavior.

In the present study, we asked students to compare their current university with an alternative university or college on five dimensions that were derived from studies of college satisfaction conducted approximately 40 years ago. Therefore, additional research is warranted that identifies the dimensions of college life that are most important for current cohorts of college freshmen. Such research could yield a revised version of the quality of alternatives scale that has demonstrated content validity for contemporary college students.

Implications

The findings of the present study call attention to the notion that, following enrollment, many freshmen continue to compare their current university with alternative universities. On average, endogenous intent-to-transfer students were over one standard deviation higher on the quality of alternatives scale than intent-to-persist students. One of the advantages of the measure

of quality of alternatives used in the present study is that we were able to examine differences in the ratings of the individual dimensions of quality of alternatives.

In the present study we found that the dimensions of quality of alternatives that contributed the most to differentiating between students who intended to persist and to transfer were social life, quality of education, and compensation. The social life dimension referred to the opportunities to meet socially relevant goals such as dating, meeting compatible or interesting people, making friends, and participating in campus events and informal social activities. The quality of education dimension included the various academic conditions that contribute to the student's intellectual and vocational development, such as the competence and helpfulness of the faculty and staff, including advisors and counselors, and the adequacy of curriculum requirements, teaching methods, and assignments. The compensation dimension pertains to the amount of school work required to obtain a desired grade and the effects of having to devote time and effort to school work on the student's fulfillment of his or her other needs and goals (Betz et al., 1970). We recommend that administrators use data on how their university compares to other universities and colleges to develop strategies for enhancing students' perceptions of the quality of the institution as well as for improving the actual quality of the educational environment that they provide students.

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Table 1

Descriptive Statistics and Reliability Estimates for the Main Study Variables

	M	*SD*	# of Items	α	Φ or r
Satisfaction Level	0.90	0.23	2		0.20[b]
Quality of Alternatives	3.03	0.53	5	0.62	
Investment Size	0.03	0.85	2		0.47[c]
Social Integration	2.70	0.95	5	0.91	
Academic Integration	1.98	0.83	5	0.85	
Goal Commitment	3.48	0.74	3	0.70	
College Graduation Intention at Time 2[a]	0.89	0.32	1		

[a]Intent to transfer coded 0 and intent to persist coded 1.

[b]Phi correlation coefficient.

[c]Pearson r correlation coefficient.

Table 2

Correlations among the Predictor Variables

	1.	2.	3.	4.	5.	6.
1. Social Integration	X					
2. Academic Integration	.209**	X				
3. Goal Commitment	.239**	-.123	X			
4. Satisfaction Level	.349***	.158*	.025	X		
5. Quality of Alternatives	-.106	.037	.019	-.139	X	
6. Investment Size	.081	-.008	.099	-.136	-.107	X

*$p < .05$ **$p < .01$ ***$p < .001$

Table 3

Differences in the Predictor Variables by College Graduation Intention at Time 2

Predictor	College Graduation Intention at Time 2[a]				t-test
	Persist		Transfer		
	M	*SD*	*M*	*SD*	
Academic Integration	1.99	0.83	1.88	0.85	0.56
Social Integration	2.69	0.94	2.72	2.69	0.89
Goal Commitment	3.49[b]	0.70	3.36	1.02	0.55
Investment Size	0.02	0.83	1.88	0.85	-0.86
Satisfaction Level	0.91[b]	0.20	0.75	0.37	2.05[c]
Quality of Alternatives	2.97	0.49	3.52	0.59	-4.85***

[a]Intent to transfer coded 0 and intent to persist coded 1.

[b] Variances were unequal and therefore the *t*-test was adjusted.

[c]$p < .06$ ***$p < .001$

Table 4

Summary of Binary Logistic Regression Model Predicting College Graduation Intention at Time 2[a]

Parameter Estimated In the Model	Block 0				Block 1				Block 2			
	b	sε b	WALD	e^b	b	sε b	WALD	e^b	b	sε b	WALD	e^b
Intercept	2.08	0.23	84.56[xxx]	8.00	1.20	1.12	1.15	3.32	7.32	2.36	9.59[xx]	1517.96
Integration Variables												
Academic Integration					0.18	0.27	0.42	1.19	0.03	0.30	0.01	1.03
Social Integration					-0.12	0.25	0.21	0.89	-0.52	0.31	2.82	0.60
Goal Commitment					0.25	0.28	0.77	1.28	0.46	0.33	1.94	1.59
Investment Variables												
Investment Size									-0.12	0.33	0.13	0.89
Satisfaction Level									2.30	1.03	5.00[x]	9.96
Quality of Alternatives									-2.29	0.58	15.74[xx]	0.10
-2LL Statistic	138.13				137.00				107.08			
Hit Rate	88.9%				88.9%				91.9%			
Model χ^2					1.13				31.05[xxx]			
Nagelkerke Psuedo R^2					.01				.29			

[x]$\rho < .05$ [xx]$\rho < .01$ [xxx]$\rho < .001$ Intent to transfer coded 0 and intent to persist coded 1.