

PREDICTORS OF ACADEMIC ACHIEVEMENT, SOCIAL ADJUSTMENT, AND
INTENTION TO PERSIST: A BIOECOLOGICAL ANALYSIS OF COLLEGE RETENTION

By

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To Calvin, Hobbes, and Evan

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Abstract of Dissertation Presented to the Graduate School
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Persistence of students to graduation from college is a major problem. Most studies of college retention, however, focus on relatively few variables, and questions remain regarding important predictors of retention. In this dissertation Bronfenbrenner and Morris's (1998) bioecological theory was used to create and test a model of predictors of retention from five social contexts (the self-system, family, peers, school, and culture) that have been shown to predict GPA, social adjustment, and intention to persist. The self-system includes personality, identity, perceived academic self-efficacy, achievement goals, and theory of intelligence. The family context includes parental involvement, feelings of relatedness to parents, and parents' support of their children's autonomy. The peer context includes relatedness to off-campus friends, and the school context includes relatedness to instructor and, on-campus friends, sense of belonging to the institution, and participation in extracurricular activities. The cultural context includes gender and ethnicity.

Participants were 299 students from a southeastern university who completed a survey online. Structural equation modeling was used to estimate the relationships in the model. Results indicated that with the exception of off-campus friends in the peer context, significant

relationships to at least one of the outcome variables were found for every ecological context. In the parent context, parents' support of their children's autonomy predicted social adjustment. In the college context, sense of belonging and relatedness to on-campus friends had direct and indirect relationships to social adjustment, and participation in extracurricular activities had a direct relationship to social adjustment. In the self-system, entity beliefs had a direct and an indirect relationship to GPA. Conscientiousness had an indirect relationship to intention to persist, and high school achievement predicted social adjustment. In the social context, gender predicted social adjustment with males more likely to be socially adjusted than females. Ethnicity predicted GPA, with White and Asian students reporting higher GPAs. Of the process variables, perceived academic self-efficacy had direct and indirect relationships to all three outcome variables. Performance-avoid goals had negative direct and indirect relationships to social adjustment and GPA. These findings offer ideas from multiple contexts that could be useful in increasing college retention, especially if adopted simultaneously.

CHAPTER 1 INTRODUCTION

Statement of the Problem

The graduation rate of college students remains a serious national concern. A comparison of students who entered a 4-year college in 1989 with those entering in 1995 showed that the rate of completion of the bachelor's degree within 5 years remained steady at about 53% (National Center for Education Statistics, 2005b). More recently, only 56.4% of the students entering college in Fall 2000 had graduated by Summer 2006 (National Center for Higher Education Management Systems, 2007). These data show little improvement in the bachelor's degree graduation rate over the last two decades. In addition, 36.9% of all undergraduates were enrolled in 2-year institutions in Fall 2005 (National Center for Education Statistics, 2007). Of the students who entered a 2-year institutions in Fall 2002, only 32.5% graduated by Spring 2006 (National Center for Education Statistics, 2007). Failure of so many students to complete a college degree in a timely fashion represents a significant economic loss to the nation and a serious personal loss to students. The purpose of this study was to test a model of college success and retention based on a bioecological perspective. This new bioecological systems model of college retention focuses on the different ecological systems that predict college success and the psychological processes that mediate the relationship between the different systems and college success. In this chapter I describe the theoretical models and empirical research that provided the basis for the variables that were included in the model.

Theoretical Background of the Study

The problem of college retention has prompted many research studies in the last 30 years. Numerous studies have been completed, and several theories have been proposed. Many variables have been linked with college retention. Tinto's (1975, 1993) interactionist theory is

one of the most widely researched theories of college retention. Tinto's model postulates that college student attrition needs to be examined as a longitudinal process of interactions between the student and the academic and social realms of college. The first part of the model indicates that students enter college with various personal characteristics that influence their decisions to leave school without completing a degree. These personal characteristics include family background, individual attributes, and pre-college schooling experiences that shape students' commitment to the educational institution and educational goals. In Tinto's model, *goal commitment* refers to how determined students are to finish college and institutional commitment refers to their determination to complete their degrees at the college where they are currently enrolled. According to Tinto, these initial commitments affect the level of students' integration into the academic and social realms of the college. Academic integration consists of the structural dimension, which refers to meeting the explicit standards of the university (i.e., GPA), and the normative dimension, which refers to students' identification with the norms of the academic system. Social integration refers to the fit between the student and the social system of the university, including interactions with peers and faculty. Tinto proposed that academic and social integration along with initial institutional and goal commitment impact subsequent institutional and goal commitment. The greater the amount of subsequent institutional and goal commitment the more likely the student will persist in college (Tinto, 1975, 1993).

Recently Braxton, Sullivan, and Johnson (1997) presented revisions to Tinto's (1975, 1993) theory. They argued that research has only partially supported Tinto's theory, and research on traditional residential colleges and commuter colleges has provided little empirical support for Tinto's theory. Braxton et al. examined further the empirical support for Tinto's model. They divided the model into 13 testable propositions. For example, the first proposition is "student

entry characteristics affect the level of initial commitment to the institution” (p. 112). Then Braxton et al. examined peer reviewed studies of Tinto’s model to find empirical support for the 13 propositions. Of these 13 propositions they concluded that, for residential universities, strong empirical support was evident for five of the propositions, but for commuter colleges strong empirical support was evident for only two of the propositions. For residential colleges, the five empirically supported propositions were “initial goal commitment affects the level of social integration,” “the greater the level of social integration, the greater the level of subsequent institutional commitment,” “initial institutional commitment affects the subsequent level of institutional commitment,” “initial goal commitment affects the subsequent level of goal commitment,” and “subsequent level of institutional commitment affects the level of persistence” (p. 135). For commuter colleges, the two empirically supported propositions were “student entry characteristics affect the level of initial commitment to the institution,” and “initial institutional commitment affects the subsequent level of institutional commitment” (Braxton et al., 1997, p. 135; Braxton, Hirschy, & McClendon, 2004). On the basis of these findings, Braxton and colleagues created two revised models of Tinto’s theory, one for residential colleges and one for commuter colleges. In the residential college model, social integration is emphasized because of the importance of social interaction and community as students are living on campus. At commuter colleges, academic integration is emphasized because there is less opportunity for social interaction at commuter colleges where most students are not on campus, other than for class (Braxton & Hirschy, 2005).

Another prominent model in the college retention literature is Bean and Eaton’s (2000) psychological model of college retention. Bean and Eaton contended that most college retention models, including Tinto’s (1975, 1993), have emphasized sociological theories to explain why

students leave college. Bean and Eaton, in contrast, argued that leaving college is a behavior and that behaviors are psychologically motivated; therefore, psychological theories can inform retention models. Their model consists of eight parts: entry characteristics, environmental interactions, psychological processes, psychological outcomes, intermediate outcomes, attitudes, intention, and behavior. Entry characteristics consist of student variables such as past performance, personality, motivations, skills, and abilities. Entry characteristics influence the institutional environment, which includes environmental interactions, psychological processes, psychological outcomes, and intermediate outcomes. Environmental interactions include bureaucratic, academic, social, and external to the institution interactions. The environmental interactions are expected to predict psychological processes, which in turn predict the psychological outcomes. For example, according to the model when students make self-efficacy judgments and assessments (psychological process), they will exhibit either positive or negative perceived self-efficacy (psychological outcome). The psychological outcomes predict the immediate outcomes of academic and social integration and academic performance. These immediate outcomes then predict attitudes such as institutional fit and institutional commitment. Attitudes predict intention, which in the retention model, is the intention to persist. Subsequently intention predicts behavior, that is, persistence.

Neuville et al. (2007) compared Tinto's (1975, 1993) model and a psychological process model. Specifically they compared three structural equation models: a version of Tinto's model, an expectancy-value model, and a combined model of Tinto's theory and expectancy-value. All three models had the same outcome variables, academic performance and intention to persist, and all three models had the same input variables: mother's education, student's high school GPA during the last year of high school, and certainty of study choice; that is the students'

estimate of their certainty of their major and if they would continue in the same major if they did not succeed academically. In addition, the Tinto model included academic and social integration variables and institutional commitment and academic engagement; the expectancy-value model included expectancy perceptions at time 1 and time 2, value perceptions, and academic engagement, and the integrative model included the variables from both models. Participants were 2,637 first-year students at a university in Belgium. The researchers collected data during the first weeks of the semester in September (Time 1) and again in November (Time 2). Results indicated that the expectancy-value model was a significantly better fit than the other two models. Within the expectancy-value model, certainty of study choice ($\beta = .37, p < .001$) was the largest predictor of persistence followed by expectancy perceptions at Time 2 ($\beta = .20, p < .001$) and value perceptions ($\beta = .19, p < .001$). High school grade ($\beta = .21, p < .001$) and expectancy perceptions at Time 2 ($\beta = .21, p < .001$) were the strongest predictors of performance followed by academic engagement ($\beta = .10, p < .001$), intention to persist ($\beta = .09, p < .001$), and mother's education ($\beta = .08, p < .001$). This study highlights the importance of motivational constructs in predicting college success and retention and is one of the first studies to compare structural models of motivational theory and Tinto's theory. However, this study examined relatively few variables and because of this limitation, their results may be spurious. I examined a more comprehensive set of predictor variables of college retention.

In summary, the purpose of this dissertation was to identify variables that predict college success and retention. Many studies have been conducted on this topic from a variety of perspectives, each one focusing on relatively few variables. Several researchers have proposed models to explain the relationships among these variables. Tinto's (1975, 1993) model has been used widely for this purpose. More recently, noticing the lack of psychological processes in

Tinto's model, Bean and Eaton (2000) developed a model of college retention that focuses on psychological processes and how these processes impact retention. In an effort to provide further clarification of the variables related to college success and retention, the purpose of this study is to use Bronfenbrenner's (1979, Bronfenbrenner & Morris, 1998) bioecological systems model as a basis for a structural model that incorporates the models of Tinto and Bean and Eaton. This new bioecological systems model of college retention focuses on the different ecological systems that predict college students' performance and persistence and the psychological processes that mediate the relationship between the different systems and college success.

Bronfenbrenner's Bioecological Model

Typically, only a few variables such as personality, previous academic achievement, and socioeconomic status are included in studies of college retention and success, and consequently, it is unclear whether findings are spurious because one or more critical variables have been left out of the model. In this study I examined a more comprehensive set of variables that may be predictive of college retention or success using Bronfenbrenner's (1979; Bronfenbrenner & Morris, 1998) bioecological model as a framework for identifying the most relevant variables to include in the study.

Bronfenbrenner and Morris's (1998) bioecological model focuses on the four components of person, process, context, and time (PPCT) and the relationships among them. The person component includes the unique characteristics of the individual. The context component includes the environment in which development is occurring. The process component comprises the interaction occurring between person and context components, and the time component includes the time encompassed in the study. In this study I examined variables for each component of Bronfenbrenner and Morris's model.

In addition to the four components of person, process, context, and time, Bronfenbrenner (1979; Bronfenbrenner & Morris, 1998) described spheres of environmental influences in his theory: the microsystem, mesosystem, exosystem, macrosystem, and chronosystem. In this study I have integrated the person, process, context, and time variables into the microsystem, macrosystem, and chronosystems. The microsystem includes activities, roles, and relationships that tend to occur on an everyday, face-to-face basis. The macrosystem includes overall patterns of the society and culture. The chronosystem represents the relationship of time to the other systems. In their later work, Bronfenbrenner and Morris also emphasized examining people's characteristics and how they influence the environment, which they referred to as the self-system.

The focus of Bronfenbrenner and Morris's (1998) bioecological theory on the multiple contexts that influence development may offer a useful framework for identifying multiple sources of influence on the retention of college student. In this study I examined the family microsystem, through the process variables of parental involvement, parental autonomy support, and parental relatedness; the peer microsystem through the process variable of off-campus friend relatedness; the college microsystem was represented in the process variables of instructor relatedness, on-campus friend relatedness, and sense of belonging on campus and the person variable of extracurricular activities; the self-system was assessed through the person variables of personality, and previous academic achievement, and the process variable of theory of intelligence; the macrosystem was assessed through the context variables of gender, ethnicity, and socioeconomic status, and the chronosystem, was assessed through the time variable of age. In addition, I examined the psychological process variables of identity, academic self-efficacy, and goal orientation as potential mediators between the systems and the outcome variables.

In my bioecological model of college retention (see Figure 1-1) the microsystems of family, peers, college, and the self-system comprise the academic and social realms that Tinto (1975, 1993) emphasized in his model. Following the microsystems in my model are the psychological processes. These processes include identity, perceived academic self-efficacy, and goal orientations. These variables were chosen because they were hypothesized as psychological processes in Bean and Eaton's (2000) model and because the literature supports the relationship between these variables and college success. Next in the model are the two immediate outcomes of the psychological process variables: academic achievement and social adjustment followed by intention to persist. In the sections that follow, I focus on each of the psychological process variables because they offer explanatory mechanisms that account for the relationships between the bioecological systems and the outcome variables. Then I discuss each of Bronfenbrenner and Morris's bioecological systems.

Psychological Processes

Identity

According to Arnett (2006), most identity exploration occurs between the ages of 18 and 25 during the period he referred to as *emerging adulthood*, not during adolescence as popularly believed. Arnett argued that in our society most identity exploration does not take place in adolescence because children are still living under the supervision of their parents. During emerging adulthood, however, most children leave home for the first time, often going to college, and this relative independence typically allows for easier identity exploration. Successful exploration is associated with positive life outcomes (Berzonsky & Kuk, 2000; Luyckx, Goossens, Soenens, Beyers, & Vansteenkiste, 2005). For example, identity is positively related to adjustment and negatively related to depressive symptoms and substance abuse in college students (Luyckx, Goossens, Soenens, & Beyers, 2006, Luyckx, Soenens, Goossens, &

Vansteenkiste, 2007). Students who experience success in college and ultimately graduate are likely to have a well established identity (Robinson, 2003).

Erikson (1968) conceived of identity as the crisis that characterizes the fifth stage of his psychosocial stages of development: the identity versus role confusion stage. He defined identity as

the awareness . . . that there is a self-sameness and continuity to the ego's synthesizing methods, the style of one's individuality, and that this style coincides with the sameness and continuity of one's meaning for significant others in the immediate community. (p. 50)

In the identity versus role confusion stage, Erikson proposed that adolescents must seek out their own ideological and occupational goals and through this exploration can either successfully achieve an identity or experience a state of role confusion where they are unsure of their goals.

Elaborating on Erikson's (1968) stage theory, Marcia (1993a) conceived of identity formation along two dimensions, exploration and commitment. Exploration is the cognitive and behavioral departure from a fixed occupational or ideological position to investigate other possibilities, and commitment is the dedication to the new position or direction (Marcia, 1993b). From his conception of identity formation along two dimensions, Marcia (1993a) described four identity statuses: identity achievement, foreclosure, identity diffusion, and moratorium. Identity achievement occurs when people make their own decisions about occupational and ideological goals and are committed to pursuing their goals. People in the identity achievement status are considered high on the exploration dimension because they have examined different alternatives in coming to their decisions and because they have made a decision they are also considered high on commitment. The foreclosure status is achieved when people have committed to occupational and ideological goals without exploration. These goals are set by others, usually the parents, instead of the individual. People in the foreclosure status are considered low on exploration because they never engaged in their own search but high on the commitment dimension because

they have made a decision about their identity. Identity diffusion occurs when people have no real ideological or occupational direction. People in identity diffusion are low on both exploration and commitment because they have not engaged in an ideological or occupational search and they have not made a commitment to any goals. Finally, people in the moratorium status are experiencing an identity crisis. They are high on the exploration dimension because they are currently searching for their own goals, but they are low on commitment because they have not made a decision yet (Marcia, 1980, 1993b).

Recently Luyckx, Goossens, et al. (2006) used confirmatory factor analysis to test a four-dimension model of identity formation. Participants were 565 freshmen from a large university in Belgium. The researchers used the Utrecht-Groningen Identity Development Scale (U-GIDS; Meeus & Dekovic, 1995) to assess Identification with Commitment and Exploration in Depth in the ideological and interpersonal domains, and the Ego Identity Process Questionnaire (EIPQ; Balistreri, Busch-Rossnagel, & Geisinger, 1995) to assess Commitment Making and Exploration in Breadth in the ideological and interpersonal domains. The four dimensions are Commitment Making, Identification with Commitment, Exploration in Depth, and Exploration in Breadth. Commitment Making refers to whether people have made an actual identity commitment; in contrast, Identification with Commitment refers to the extent people feel certain and confident about their commitment. Exploration in Breadth refers to the extent which people have explored different identity alternatives, and Exploration in Depth refers to the extent that people have explored their current commitment in detail. Luyckx, Goossens, et al. found that the four-dimension model of identity was a better fit to the data than the two- and three-dimension models. They assessed academic and social adjustment using a shortened version of the Student Adaptation to College Questionnaire (SACQ; Baker & Siryk, 1984), and they used the shortened

version of the Center for Epidemiologic Studies Depression Scale (CESD; Radloff, 1977) to measure depressive symptoms. The results indicated that Commitment Making ($r = .19, p < .001$) and Identification with Commitment ($r = .38, p < .001$) were positively related to social adjustment. Commitment Making ($r = .33, p < .001$) and Identification with Commitment ($r = .42, p < .001$) were also related to academic adjustment. Commitment Making ($r = -.25, p < .001$) and Identification with Commitment ($r = -.34, p < .001$) were negatively related to depressive symptoms. Commitment Making was negatively related to substance use ($r = -.12, p < .001$). Exploration in Depth was positively related to academic adjustment ($r = .31, p < .001$) and negatively related to substance use ($r = -.12, p < .01$). Exploration in Breadth was positively related to depressive symptoms ($r = .20, p < .001$) and substance use ($r = .16, p < .001$).

Exploration in Breadth could signal an identity crisis, which could explain the relationship with depressive symptoms and substance use. In sum, Luyckx, Goossens, et al. indicated that the identity dimensions of Commitment Making and Commitment with Identification have positive relationships with social and academic adjustment and negative relationships with depression and substance abuse. Of particular importance, their study expanded upon Marcia's (1993a) original conception of identity by separating identity into four dimensions, instead of the two dimensions Marcia originally proposed. Having four dimensions instead of two allows for a more thorough examination of identity development. However, it is unclear whether the results of the Luyckx, Goossens, et al. study conducted with freshmen at a university in Belgium will generalize to a predominantly female, upper-division, middle-class sample of American university students.

In another study to refine the four-dimension conception of identity, Luyckx et al. (2005) conducted a cluster analysis of the responses of 565 freshmen in educational psychology classes

in a university in Belgium to two identity measures: The U-GIDS (Meeus & Dekovic, 1995) was used to assess Identification with Commitment and Exploration in Depth in the domains of education and friendship, and the EIPQ (Balistreri et al., 1995) was used to assess Commitment Making and Exploration in Breadth in the ideological and interpersonal domains. Academic and social adjustment were assessed using a shortened version of the SACQ (Baker & Siryk, 1984). The shortened version of the CESD (Radloff, 1977) was used to measure depressive symptoms. The Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965) was used to measure self-esteem and substance use was measured by asking participants if they had used drugs or drank too much in the last 6 months. Using the four dimensions of identity, Exploration in Breadth, Exploration in Depth, Commitment Making, and Identification with Commitment, Luyckx et al. concluded that the data fit best into five clusters instead of the four Marcia (1993a) conceived. However, four of these clusters were consistent with Marcia's definition of the four identity statuses and had similar relationships with criterion variables. Participants in the Achievement Cluster were high in Exploration in Breadth and Commitment Making, which is consistent with Marcia's definition of Achievement. They were also high in Exploration in Depth and Identification with Commitment. Participants in the Foreclosure Cluster were low in Exploration in Breadth and high in Commitment Making, which is consistent with Marcia's definition of Foreclosure. They were also moderately high in both Identification with Commitment and Exploration in Depth. Participants in Moratorium Cluster were high in Exploration in Breadth and low in Commitment Making, which is consistent with Marcia's definition of Moratorium. They were also low in Identification with Commitment and moderately high in Exploration in Depth. Luyckx et al. found that two types of clusters for Diffusion, which they identified as the Diffused Diffusion Cluster and the Carefree Diffusion Cluster. Participants in the Diffused Diffusion Cluster were

low in Commitment Making and moderate in Exploration in Breadth. They were also low in Identification with Commitment and Exploration in Depth. Students in the Carefree Diffusion Cluster were moderate in Commitment Making and low in Exploration in Breadth. They were also low in Exploration in Depth and low to moderate in Identification with Commitment. Luyckx et al. found that for social adjustment, students in the Achievement ($M = 3.83$), Foreclosure ($M = 3.70$), and Carefree Diffusion clusters ($M = 3.62$) scored high, whereas students in the Moratorium ($M = 3.59$) and Diffused Diffusion clusters ($M = 3.31$) scored low on social adjustment. For academic adjustment, students in the Achievement ($M = 3.57$) and Foreclosure clusters ($M = 3.45$) scored high, whereas students in the Diffused Diffusion cluster ($M = 2.75$) scored low. For depressive symptoms students in the Moratorium ($M = 1.95$) and Diffused Diffusion clusters ($M = 2.13$) scored high. For self-esteem students in the Moratorium ($M = 2.89$) and Diffused Diffusion clusters ($M = 2.71$) scored lowest. Students in the Moratorium cluster also reported the most substance use ($M = 2.01$), whereas students in the Foreclosure Cluster had the lowest amount of substance use ($M = 1.69$). All these means were significantly different from each other. These findings suggest that experiencing the Moratorium or Diffused Diffusion identity status may have a negative impact on college students. Like the Luyckx, Goosens, et al. study (2006), it is unclear whether these results from a sample of first-year predominantly female (85%) middle-class Cuscasian students at a university in Belgium are generalizable to a predominantly female, middle-class sample of predominantly upper-division American university students.

In a study of identity and academic outcomes, Berzonsky and Kuk (2000) examined how identity status relates to the transition to college. Participants were 363 freshmen from a medium-sized university in New York. The researchers measured identity status with the

Objective Measure of Ego Identity Status (OM-EIS; Adams, Shea, & Fitch, 1979) and used the Student Developmental Task and Lifestyle Inventory (SDTLI; Winston & Miller, 1987) to assess the extent to which students were prepared to adapt to college by measuring students' academic autonomy, mature interpersonal relationships, and educational purpose. Berzonsky and Kuk found that students who were in the Achievement and Moratorium statuses were better prepared to act autonomously in college without needing excessive reassurance from others. This finding was replicated by Boyd, Hunt, Kandell, and Lucas (2003) with 2,818 first-year students at a large east coast university who completed the Identity Styles Inventory (ISI; Berzonsky, 1992) and the University New Student Census (UNSC). The UNSC asked students about their academic expectations and retention. Boyd et al. determined that first-year college students with an informative identity style (Achievement or Moratorium) were more likely to be prepared for college. In particular, these students perceived themselves as prepared for college and were open to learning new skills that might help them succeed in college. Thus, the positive relationship between Moratorium and college adjustment in the Berzonsky and Kuk study and the Boyd et al. study conflict with the Luyckx et al. (2005) finding that students in Moratorium experienced low academic and social adjustment, raising the question of whether Moratorium is a positive predictor of persistence and success in college. To explore this question further Luyckx et al. (2008) created a new identity measure in an attempt to clarify the difference between positive and negative exploration in the Moratorium stage. Specifically they proposed another dimension of exploration called Ruminative Exploration as a potential explanation of the mixed findings in the literature. They described Ruminative Exploration as occurring when people become stuck in the exploration process mulling over different alternatives and having trouble making commitments To study this new dimension Luyckx et al. created a new measure, the Dimensions

of Identity Development Scale (DIDS) to assess five identity dimensions, Commitment Making, Identification with Commitment, Exploration in Breadth, Exploration in Depth, and Ruminative Exploration. The researchers administered the DIDS to a sample of 263 freshmen at a university in Belgium. The sample was 72.6% female with a mean age of 19.4. Confirmatory factor analyses revealed that the five-factor model of identity was a significantly better fit than a four-factor model of identity ($df = 265$, Satorra-Bentler scaled chi-square = 658.93, RMSEA = .07, CFI = .94). A cluster analysis was conducted to capture the interactions of the identity statuses. Six clusters emerged, including Achievement, Diffused Diffusion, Carefree Diffusion, Ruminative Moratorium, Foreclosure, and Undifferentiated. The Achievement cluster scored high on Commitment Making and Identification with Commitment, moderately high on Exploration in Breadth and Exploration in Depth, and low on Ruminative Exploration. The Diffused Diffusion cluster scored low on Commitment Making and Identification with Commitment, intermediate on Exploration in Breadth and Exploration in Depth, and high on Ruminative Exploration. The Carefree Diffusion cluster scored low on Commitment Making, Identification with Commitment, Exploration in Breadth, and Exploration in Depth, and intermediate on Ruminative Exploration. The Ruminative Exploration cluster scored low on Commitment Making and Identification with Commitment, and high on Exploration in Breadth, Exploration in Depth, and Ruminative Exploration. The Foreclosure cluster scored high on Commitment Making and Identification with Commitment, and low on Exploration in Breadth, Exploration in Depth, and Ruminative Exploration. The Undifferentiated cluster scored intermediate on all dimensions except Exploration in Breadth, which was moderately high. Self-esteem, depressive symptoms, anxiety symptoms, self-reflection, and self-rumination were also assessed in this study. Self-esteem was assessed using the RSES (Rosenberg, 1965). Depressive

symptoms were assessed using 12 items of the CES-D (Radloff, 1977). Anxiety symptoms were assessed using the revised Symptom Checklist (SCL-90-R; Arrindell & Ellema, 1986). Self-reflection and self-rumination were assessed using the Rumination-Reflection Questionnaire (RRQ; Trapnell & Campbell, 1999). For self-esteem, the Achievement ($M = 3.30$) and Foreclosure clusters ($M = 3.34$) scored the highest and the Diffused Diffusion ($M = 2.67$) and Ruminative Moratorium clusters ($M = 2.52$) scored the lowest. For depression symptoms, the Achievement ($M = 1.78$), Foreclosure ($M = 1.57$), and Carefree Diffusion clusters ($M = 1.81$) scored the lowest and the Diffused Diffusion ($M = 2.35$) and Ruminative Moratorium clusters ($M = 2.38$) scored the highest. For anxiety symptoms, the Achievement ($M = 2.02$), Foreclosure ($M = 1.82$), and Carefree Diffusion clusters ($M = 1.69$) scored the lowest and the Diffused Diffusion ($M = 2.52$) and Ruminative Moratorium clusters ($M = 2.50$) scored the highest. For self-reflection, the Achievement ($M = 3.81$) and Ruminative Moratorium clusters ($M = 3.69$) scored the highest and the Carefree Diffusion cluster ($M = 3.26$) scored the lowest. For self-rumination, the Ruminative Moratorium ($M = 4.02$) and Diffused Diffusion clusters ($M = 3.76$) scored the highest and the Achievement ($M = 3.37$), Carefree Diffusion ($M = 3.30$), and Foreclosure clusters ($M = 3.01$) scored the lowest. All these means were significantly different from each other. From these data, Luyckx et al. concluded that commitment is what separates successful from unsuccessful identity development because the Achievement and Foreclosure clusters both scored high on both dimensions of identity and they were the most adaptive clusters. Therefore in my study I only examined the commitment dimensions and their relationships to academic achievement and social adjustment.

Robinson (2003) examined whether identity mediated the relationship between academic integration and both short- and long-term persistence in college in a sample of 212 undergraduate

students. Robinson defined academic integration as the students' perception of their academic performance and intellectual development, and social integration as the quality of students' relationships with both their peers and faculty and used the Institutional Integration Scale (Pascarella & Terenzini, 1980) to measure academic and social integration. Robinson measured identity with the identity subscale of the Ego Development Scale (Ochse & Plug, 1986), and short-term persistence by the Persistence at the Institution (PAI) and long-term persistence by the Persistence in Higher Education (PHE) subscales of the Undergraduate Persistence Intention Measure (UPI; Robinson, 1996). The results indicated that identity did mediate the relationship between academic integration and short-term persistence. Identity was the only variable that predicted long-term persistence in college ($\beta = .31, p = .05$). Academic integration did not predict long-term persistence in college, suggesting that identity may become more important for academic success as students progress through college. African American students were overrepresented in this sample (35%) because some of the students were recruited from a Black studies course, and these results may not generalize to all college populations. This study indicates that identity does predict college success and persistence, though its exact role remains unclear because Robinson did not measure identity with the more discriminating dimensions of Commitment Making and Identification with Commitment.

I examined if identity, as measured by Commitment Making and Identification with Commitment, predicts academic achievement, social adjustment, and intention to persist in college students. Studies have linked identity, in particular Commitment Making and Identification with Commitment, to academic adjustment (Luyckx et al., 2005; Luyckx, Goossens, et al., 2006), and to social adjustment (Luyckx et al., 2005; Luyckx, Goossens, et al., 2006). One study has also linked identity with persistence (Robinson, 2003). Because previous

research has established a link between identity and adjustment, I hypothesized that identity is positively related to social and academic achievement in my model. On the basis of Robinson's study, I also hypothesized that identity predicts persistence in college students.

Achievement Goal Theory

Achievement goal theory is comprised of two main types of goals: mastery goals, also referred to as learning goals, and performance goals. Mastery goals focus on learning the task for self-improvement, meeting a challenge, or gaining new understanding and insight. Performance goals focus on demonstrating ability or competence, especially relative to others, such as receiving the highest grade or being the best in the class. Performance goals are often divided into two types, approach and avoidance. Performance-approach goals focus on demonstrating competence and outperforming others. Performance-avoid goals focus on trying to avoid looking incompetent (Schunk, Pintrich, & Meece, 2008). Dweck (1999) has reported positive effects of mastery goals on learning in experimental studies, and Schunk et al. described studies that have shown relationships between students' mastery goals and their self-reports of use of self-regulatory learning strategies in education from elementary school through college.

At the college level, Hsieh, Sullivan, and Guerra (2007) examined the relationship of goal orientation and perceived self-efficacy to GPA. Participants were 112 undergraduates from a large university in the southwest that serves predominantly Hispanic students. Forty-six percent of the sample was Hispanic, and 41% was Caucasian. Goal orientation was measured using the Achievement Goal Orientation Inventory (Elliot & Church, 1997). Performance-avoid and mastery goals were the strongest predictors of GPA. Performance-avoid goals were negatively related to GPA ($r = -.35, p < .01$) and mastery goals were positively related to GPA ($r = .40, p < .01$); however, performance-approach goals were not related to GPA. This study suggests that mastery goals may be important to academic success in college. Students with mastery goals

were more likely to succeed academically; however, further research is needed. As the study was correlational, the direction of the relationship is unclear, and Hsieh et al. did not control for prior ability. To explore further the relationship between mastery goals on the basis of the results of Hsieh et al., in my model I hypothesized that mastery goals predict academic achievement and performance-avoid goals are negatively related to academic achievement.

Although I found no study that has examined the relationship of achievement goals to college persistence or social adjustment, Bean and Eaton (2000) hypothesized in their model that the psychological processes affect both academic and social integration. On this basis, I hypothesized that mastery goals predict social adjustment and performance-avoid goals predict social adjustment.

Perceived Academic Self-Efficacy

Perceived self-efficacy is defined as the extent to which one feels confident to perform a task (Bandura, 1997; Gaskill & Woolfolk Hoy, 2002). Perceived academic self-efficacy is the belief in one's ability to successfully perform academic tasks. Many studies have shown that students with strong academic self-efficacy beliefs display higher levels of motivation and skills and earn higher grades than students with weaker levels of perceived academic self-efficacy (Schunk et al., 2008). Experimental research has shown that raising perceptions of self-efficacy increases students' perseverance and achievement (Bandura, 1997). In their meta-analysis of the relationship of self-efficacy beliefs to academic outcomes, Multon, Brown, and Lent (1991) found that students' perceived self-efficacy was related to their academic performance at all educational levels, but the relationship was strongest for college students ($r = .35$).

In a study examining predictors of college performance, Elias and MacDonald (2007) examined the effects of prior achievement and perceived academic self-efficacy on college achievement in 202 undergraduates, using the Academic Self-Efficacy Scale (ASES; Elias &

Loomis, 2000). Results indicated that both academic self-efficacy and high school GPA predicted college GPA, but their regression analysis showed that perceived academic self-efficacy accounted for a greater proportion of variance in college GPA than did high school GPA. In a meta-analysis of 109 studies examining psychosocial and study skill factors and their relationship to college outcomes, Robbins, Lauver, Le, Davis, Langley, and Carlstrom (2004) found that perceived academic self-efficacy predicted retention (true score correlation = .36) and GPA (true score correlation = .50). In another study of 364 college students, Bembenutty (2007) found that perceived academic self-efficacy was significantly correlated with course grades for Caucasian males ($r = .62$), Caucasian females ($r = .62$), minority males ($r = .51$) and minority females ($r = .75$). Perceived academic self-efficacy was measured using the academic self-efficacy subscale of the Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich, Smith, Garcia, & McKeachie, 1991). In sum, these three studies all indicate that perceived academic self-efficacy predicts GPA.

Perceived self-efficacy has also been linked to social outcomes in college. DeWitz and Walsh (2002) examined the relationship between college satisfaction and perceived self-efficacy in 312 undergraduates from a large Midwestern university using the College Self-Efficacy Inventory (CSEI; Solberg, O'Brien, Villareal, Kennel, & Davis, 1993). The CSEI measures perceived self-efficacy in various areas of college life including courses and roommates. College satisfaction was measured using the College Student Satisfaction Questionnaire, Form D (CSSQ; Betz, Betz, & Menne, 1989). One of the subscales of the CSSQ is social life, which measures the perception of one's social network and whether there are opportunities to interact socially. Results indicated that perceived college self-efficacy was related to overall college satisfaction ($\beta = .48$). An ANOVA comparing high- and low self-efficacy groups indicated a significant

difference in overall college satisfaction between the low- and high- self-efficacy groups ($F = 43.91, p < .0001$). A MANOVA was conducted comparing the high and low self-efficacy groups on the five subscales. For the social life subscale, there was a significant difference between the high and low groups, indicating that students with higher perceived self-efficacy for college had higher social life satisfaction ($F = 30.41, p < .0001$). A possible interpretation of this finding is that students with high perceived academic self-efficacy are likely to be more successful in academics and therefore less stressed, so they were more likely to enjoy their social life than students' with low perceived self-efficacy. However, it is also possible that students' with higher life satisfaction may have higher perceived self-efficacy due to their positive feelings about their social life.

In relation to other types of motivation, perceived self-efficacy has been linked to goal orientations. At the college level, Hsieh et al. (2007) examined the relationship of goal orientation and self-efficacy on GPA. Participants were 112 undergraduates from a large university in the southwest that predominantly serves Hispanic students. Forty-six percent of the sample was Hispanic and 41% was Caucasian. Goal orientation was measured using the Achievement Goal Orientation Inventory (Elliot & Church, 1997). Perceived academic self-efficacy was measured using items from the Patterns of Adaptive Learning Survey (PALS; Midgley, Maehr, & Urdan, 1993). The results showed that students with higher perceived self-efficacy reported significantly more mastery goals than students with lower perceived self-efficacy ($F = 13.16, p < .001$). There was no significant difference in the number of performance-approach and performance-avoid goals for students with high and low perceived academic self-efficacy.

In sum, perceived academic self-efficacy has been linked with academic achievement (Bembenutty, 2007; Elias & MacDonald, 2007; Multon et al., 1991; Robbins et al., 2004), retention (Robbins et al., 2004), and social adjustment (DeWitz & Walsh, 2002), and mastery goals (Hsieh et al., 2007). On the basis of those findings, I hypothesized in my model that perceived academic self-efficacy predicts mastery goals, academic achievement, social adjustment, and intention to persist.

The Bioecological Systems

The Family Microsystem

Within the family microsystem, the process variables of parental involvement, parental autonomy support, and parental relatedness were examined. The research evidence indicates that each of these variables has been linked to one or more of the outcome variables of academic achievement, social adjustment, and intention to persist. In the following sections, each variable is reviewed separately, and any research that connects the family microsystem variables to any of the psychological processes variables is also discussed.

Parental involvement

Grolnick (2003) defined parental involvement as “the provision of resources by the parent for the child” (p. 16). Many studies have shown the relationship of parental involvement to students’ school success in elementary and secondary schools (see Hoover-Dempsey & Sandler, 1995, for a review of this literature). It is likely that parents can and do play a role in whether their children persist to graduate from college. Recent research on parental involvement during the college years suggests that it may reduce the rate of attrition among college students. Researchers have reported relationships between parental involvement in college and their students’ educational aspirations (McCarron & Inkelas, 2006), college choice (Bers, 2005), self-regulation (Hofer, Kennedy, & Hurd, 2006), academic and emotional adjustment (Duchesne, Ratelle, Larose, &

Guay, 2007), achievement, autonomy, competence, and relatedness (Ratelle, Larose, Guay, & Senécal, 2005), and perceived self-efficacy (Cordell-McNulty & Ashton, 2006).

In a study of parental involvement at the college level, Ratelle, Larose, Guay, and Senécal (2005) investigated a mediational model in which college students' perceptions of parental involvement predicted persistence in a science curriculum by fostering the self-processes of autonomy, competence, and relatedness. Participants were recruited during their last year of high school in Quebec, Canada. The data were analyzed for the 262 participants who had completed all measures. Parental involvement was measured by assessing students' perceptions of their parents' involvement in their vocational decision-making process using a scale adapted from Barnes and Olson (1992). The researchers measured science achievement by the students' self-reports of their high school science grades and persistence in a science program by checking to see if students were still enrolled in a science program during their third year of college. The results showed that students' perceptions of their parents' involvement were positively associated with science achievement ($r = .14, p < .05$), but perceived parental involvement was not a predictor of persistence in the science program. Students' perceptions of parental involvement were positively associated with their autonomy ($r = .34, p < .001$), competence ($r = .24, p < .001$), and relatedness ($r = .28, p < .001$). Analysis of the authors' mediation model showed that students' perceptions of parental involvement predicted their feelings of relatedness ($\beta = .31, p < .05$) and autonomy in the science program ($\beta = .22, p < .05$). On the basis of these findings, the authors proposed that perceived parental involvement predicts student self-processes but not persistence, which was an outcome of the self-processes. This study shows that perceived parental involvement was related to science achievement; however a major weakness of this study is that the authors analyzed students' grades in high school, not in college. I

investigated whether parental involvement predicts college achievement. Another weakness of this study is that a large percentage (71%) of the sample of college students lived at home with their parents. It is possible that parental involvement had a significant relationship to students' science achievement because many of these participants lived with their parents. It is unclear whether the findings generalize to college samples where most of the students do not live with their parents. I examined a sample of university undergraduates with only a small percentage who live at home with their parents.

In regard to perceived academic self-efficacy, in a study of 346 students at a state university in the Northeast, Cordell-McNulty and Ashton (2006) found a positive relationship between parental involvement in college and perceived academic self-efficacy using the self-efficacy subscale of the Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich et al., 1991). Perceptions of parental involvement was measured by questions from the student survey of the High School and Family Partnership (Epstein, Connors, & Salinas, 1993) that were adapted to measure aspects of college students' perceptions of parental involvement. Students who knew their parents had expectations for them ($t = 3.41, p = .001$) and received praise from their parents ($t = 3.39, p = .001$) were more likely to have higher perceived academic self-efficacy. Byars-Winston and Fouad (2008) examined the relationship between students' perceptions of their parents' involvement and students' perceived self-efficacy in math and science using the Math/Science Self-Efficacy Scale (Smith & Fouad, 1999) and the Parental Involvement Scale (Ferry, Fouad, & Smith, 2000), which measured students' perceptions of parental encouragement and expectations for math, science, and career choices. Participants were 227 undergraduates from two Midwestern universities. Results indicated that students'

perceptions of their parents' involvement directly predicted perceived mathematics and science self-efficacy ($\beta = .13$).

On the basis of these studies showing that parental involvement is related to perceived academic self-efficacy in college students (Byars-Winston & Fouad, 2008; Cordell-McNulty & Ashton, 2006) and academic achievement (Ratelle et al., 2005), I hypothesized in my model that parental involvement predicts perceived academic self-efficacy and academic achievement.

Relatedness to parents

Relatedness refers to the human need to feel connected to others and involves loving and caring for others and being loved and cared for by others and is one of the three basic psychological needs according to self-determination theory (Deci & Ryan, 2000). Relatedness is sometimes called belongingness and, more recently in the counseling literature, mattering to others. Baumeister and Leary (1995) described the belongingness hypothesis as human beings having a pervasive drive to form and maintain at least a minimum quality of lasting, positive, and significant interpersonal relationships.

Research has shown that a lack of relatedness, belongingness, or mattering to others predicts negative psychological outcomes. Baumeister and Leary (1995) reviewed a wide range of research showing that being rejected, ignored, or excluded, that is experiencing a lack of relatedness, is associated with strong negative feelings such as depression and anxiety. The absence of mattering, a counseling term for relatedness (Dixon Rayle, 2006), has also been linked to higher levels of depression and academic stress (Dixon Rayle & Chung, 2007).

Cutrona, Cole, Colangelo, Assouline, and Russell (1994) examined whether parental social support predicted GPA for undergraduates. They conducted three studies. In the first study participants were 418 undergraduates at a Midwestern university. Parental social support was measured using the Social Provisions Scale Parent Version (SPS-P; Cutrona, 1989; Cutrona &

Russell, 1987). Causal modeling showed that parental social support predicted college GPA ($\beta = .19, p < .01$). In the second study participants were 378 undergraduates from a Midwestern university. For this study the entire Social Provisions Scale (SPS-SS) was administered to assess social support from parents, friends, and romantic partners. Once again, parental social support predicted GPA ($\beta = .14, p < .05$), but social support from friends and romantic partners did not. These studies are unique in that they measure perceptions of parental support during college and GPA during college. On the basis of these findings, I examined whether relatedness to parents predicts academic achievement in college students.

In relation to identity formation, Luyckx, Goossens, et al. (2006) analyzed students' perceptions of supportive parenting and identity with 565 freshmen at a University in Belgium. The authors assessed supportive parenting by assessing emotional separation from parents using a shortened version of the Psychological Separation Inventory (PSI; Hoffman, 1984). The sample consisted of Belgian college students who were predominantly Caucasian and over 85% female. They reported that among college students emotional separation from their parents was negatively related to Commitment Making ($\beta = -.17, p < .01$) and Exploration in Depth ($\beta = -.19, p < .001$), indicating that college students who experienced relatedness to parents were more like to make an identity commitment and seek out information about that commitment. As mentioned earlier, the major concern about this study is whether the results generalize to U.S. students. The results from Luyckx, Goossens, et al. indicate a relationship between parental relatedness and identity formation, in particular that parental relatedness is positively related to Commitment Making.

In relation to goal theory, Moller, Elliot, and Friedman (2008) examined the relationship between achievement goals and parental closeness. Two studies were conducted, one examining

parental closeness after an exam and prior to receiving feedback, and one after receiving feedback. Participants in the first study were 182 undergraduates. The researchers measured achievement goals using the Achievement Goal Questionnaire (Pekrun, Elliot, & Maier, 2006) and perceived closeness to parents with a measure created by McGregor and Elliot (2005). This measure consisted of two questions, “Right now, how close do you feel to your mother/father?” Results indicated that mastery-approach goals were positive predictors of perceived closeness to parents after taking the exam ($\beta = .19, p < .01$). Participants in the second study were 227 undergraduates. The only difference in Study 2 was that perceptions of closeness to parents was measured again after students received a grade for the exam. Results indicated that students with mastery-approach goals reported feeling closer to their parents after receiving feedback ($\beta = .10, p < .05$). For students with performance-avoid goals, feelings of closeness to their parents depended on performance outcomes. However, the direction of causality of this relationship cannot be determined from this study. I hypothesized that parental relatedness predicts students’ tendency to form mastery goals because if students feel close to their parents they are less worried about impressing them and are more likely to focus on learning for understanding.

In summary, research has linked relatedness to parents with Commitment Making (Luyckx, Goossens, et al., 2006), mastery goals (Moller et al., 2008), and academic achievement (Cutrona et al., 1994). On the basis of these studies, I hypothesized in my model that relatedness to parents predicts Commitment Making, mastery goals, and academic achievement.

Parental autonomy support

Need for autonomy, defined as the desire to have agreement between one’s actions and experiences and one’s sense of self, is one of the three basic psychological needs postulated in self-determination theory (SDT) (Deci & Ryan, 2000). Research has shown that children whose parents provide autonomy support, that is, who support their children’s need for autonomy, tend

to be more self-regulated and have higher academic achievement than children whose parents provide less support of their autonomy (Grolnick, 2003). Ratelle et al. (2005) examined the relationship between parental autonomy support and their college students' persistence in a science program. The researchers measured parental autonomy support by assessing students' perceptions of their parents' autonomy support in relation to their decision to pursue science studies in college. Items were adapted from Paulson, Marchant, and Rothlisberg (1994) and Robinson et al. (1995). A sample item is "my parents allowed me to have my own point of view regarding my choice of program." Ratelle et al. found that parental autonomy support was positively associated with students' science achievement ($r = .20, p < .01$) and that parental autonomy support predicted persistence in the college science program 2 years later ($\beta = .20, p < .05$). A weakness of this study is that the researchers only assessed science achievement in high school, not in college. I will examine parental autonomy support during college to see if it predicts college achievement.

In a more recent examination of the conceptualization of parental autonomy support, Soenens et al. (2007) completed two studies and found that parental autonomy support, conceptualized as promotion of volitional functioning, predicted psychological adjustment in college students. Participants in the first study were 390 first-year students at a Belgian university. Parental autonomy support was measured using items from the Autonomy Support scale of the Perceptions of Parents Scale (POPS; Grolnick, Ryan, & Deci, 1991) and one item from Silk, Morris, Kanaya, and Steinberg (2003). Psychosocial functioning was assessed by examining three constructs: depression, self-esteem, and social well-being. Depression was measured using the CES-D (Radloff, 1977). Self-esteem was measured using the RSES (Rosenberg, 1965), and social well-being was measured using the Social Well-Being scale from

the Louvain Well-Being Scale (Marcoen, Van Cotthem, Billiet, & Beyers, 2002). The results of this study indicated that parental autonomy support predicted psychosocial functioning ($\beta = .05$, $p < .05$). In their second study the researchers studied 495 undergraduates from a Belgian university using the same measures except that they measured social well-being using the Social Adjustment subscale of the SACQ (Baker & Siryk, 1984). This study confirmed the results from the first study. Parental autonomy support predicted psychosocial functioning ($\beta = .34$, $p < .001$). However, most Belgian college students live at home; therefore, these students have frequent contact with their parents. It is unclear whether these results will generalize to college students in the U.S. who do not live at home. In contrast, I examined whether the relationship of parental autonomy support to college achievement, social adjustment, and intention to persist is evident in a sample of students who typically do not live at home.

In relation to identity, Luyckx, Goossens, et al. (2006) analyzed identity and supportive parenting with 565 freshmen at a university in Belgium by measuring parental responsiveness, autonomy support, and psychological control. Parental responsiveness items were from the Child Report on Parent Behavior for Older Children and Adolescents (CRPBI -30; Schludermann & Schludermann, 1988). Psychological control items were from the Parental Psychological Control Scale—Youth Self-Report (PCS—YSR; Barber, 1996). Autonomy support items were from the Perceptions of Parents Scales (POPS; Grolnick et al., 1991). The researchers found a positive relationship between a supportive parent-child relationship and Commitment Making ($\beta = .16$, $p < .01$) and Identification with Commitment ($\beta = .21$, $p < .001$). In another study Luyckx, Soenens, Vansteenkiste, et al. (2007) examined the relationship of parental psychological control to identity formation in college students. Parental psychological control is generally considered to be the opposite of parental autonomy support and an inhibitor of autonomy in adolescents. The

researchers conducted a longitudinal study with 565 Belgian undergraduates using the Utrecht-Groningen Identity Development Scale (U-GIDS; Meeus & Dekovic, 1995) to measure Identification with Commitment and Exploration in Depth and the Ego Identity Process Questionnaire (EIPQ; Balistreri et al., 1995) to measure Commitment Making and Exploration in Breadth. Parental psychological control was measured using the Psychological Control Scale—Youth Self-Report (Barber, 1996). Students were assessed on these measures five times, with 6 months between each data collection. Luyckx, Soenens, Vansteenkiste, et al. found that parental psychological control was associated with less Commitment Making ($\beta = -.10, p < .05$) and less Identification with Commitment ($\beta = -.12, p < .05$), suggesting that parental autonomy support should be associated with more Commitment Making and Identification with Commitment. However, the results of Luyckx, Goossens, et al. and Luyckx, Soenens, Vansteenkiste, et al. may not be generalize to other populations. The participants in these studies were all Caucasian Belgian university students. I examined whether these results generalize to a sample of U.S. college students.

In summary, research has linked parental autonomy support with Commitment Making and Identification with Commitment (Luyckx, Goossens, et al., 2006; Luyckx, Soenens, Vansteenkiste, et al., 2007), academic achievement (Ratelle et al., 2005), social adjustment (Soenens et al., 2007), and persistence (Ratelle et al., 2005). In my model, I hypothesized that parental autonomy support is positively related to Commitment Making, Identification with Commitment, academic achievement, social adjustment, and intention to persist.

The Peer Microsystem

Peers play an important role in the lives of adults during emerging adulthood (Arnett, 2000, 2006). Because of the potential role of peers in this period, I examined the peer microsystem. The peer microsystem consists of the process variable of off-campus friend

relatedness. The research evidence indicates that peer relatedness has been linked to identity development and social adjustment.

Peer relationships tend to become more important as students age through adolescence and emerging adulthood, and it is likely that peer relationships play an important role in the lives of most college students. In her study of college outcomes, Fischer (2007) used data from the National Longitudinal Survey of Freshmen. Equal numbers of White, Black, Hispanic, and Asian students were sampled from each college resulting in a total of 3,924 participants. Outcome variables for this study were college GPA and whether students left their initial college by the end of their junior year. Fischer found that, for minority students, greater involvement in formal social activities as measured by extracurricular activities and volunteering was related to higher grades ($\beta = .08, p < .05$ for Asian students, $\beta = .17, p < .001$ for Hispanic students, and $\beta = .11, p < .01$ for Black students), but for Black and White students, having more ties off campus, measured by the number of visits home and how many friends the student frequently contacted off campus, was negatively related to their grades ($\beta = -.15, p < .05$ for Black students and $\beta = -.14, p < .10$ for White students). For all ethnic groups, a strong relationship between relatedness to peers and college retention was found. However, the direction of the relationship differed for on-campus and off-campus friends. As scores for informal ties on-campus increased, measured by the number of close on-campus friends, hours spent partying per week, and hours spent with friends per week, the likelihood that students would leave college decreased ($\beta = -.89, p < .05$ for White students, $\beta = -1.65, p < .001$ for Asian students, $\beta = -1.56, p < .01$ for Hispanic students, and $\beta = -1.20, p < .01$ for Black students). Off-campus ties however, were related to a greater probability of leaving college for Black ($\beta = 1.26, p < .05$) and White students ($\beta = 1.43, p < .05$). These findings suggest that for college students the relationship of peer relatedness to

academic achievement and persistence may differ for on-campus and off-campus friends, so I examined relatedness to both off-campus and on-campus friends.

In a study of the importance of friends, Buote et al. (2007) examined the relationship between friendship and adjustment during the first year of college in 702 first-year students from six different Canadian universities. The SACQ (Baker & Siryk, 1984) was used to measure adjustment, and the McGill Friendship Questionnaire Friend's Functions (MFQ-FF, short form; Mendelson & Aboud, 1999) was used to measure friendship. The MFQ-FF measures six functions of friendship in reference to a particular friend: stimulating companionship, help, intimacy, reliable alliance, self-validation, and emotional security. Buote et al. found that overall friendship quality predicted all forms of university adjustment, academic ($t= 4.32, p < .001$), social ($t= 15.53, p < .001$), and institutional attachment ($t= 10.95, p < .001$). In a study examining social support and adjustment of 115 first-year undergraduates at a midsized Canadian university, Friedlander, Reid, Shupak, and Cribbie (2007) examined the relationship between social support from friends and adjustment to college. Data were collected during their first and second semesters. Social support from friends was assessed using the Multidimensional Scale of Perceived Social Support (MSPSS; Zimet, Dahlem, Zimet, & Farley, 1988). Adjustment was measured using the SACQ (Barker & Siryk, 1989). From the fall to spring semester, increased social support from friends predicted improved overall adjustment ($\beta = .19, p < .05$), social adjustment ($\beta = .20, p < .05$), and personal-emotional adjustment ($\beta = .19, p < .05$). The results of these two studies (Buote et al., 2007; Friedlander et al., 2007) illustrate the positive relationship between friends and adjustment, but neither study examined if relatedness to peers is related to academic achievement or intention to persist.

In summary, research has linked relatedness to off-campus friends with social adjustment (Buote et al., 2007; Friedlander et al., 2007). On the basis of these studies, I hypothesized that relatedness to off-campus friends predicts social adjustment in my model.

The College Microsystem

The college environment is likely to play an important role in the success of college students. The college microsystem is a part of social integration in Tinto's (1975) model. The college microsystem includes the process variables of relatedness to instructor, relatedness to on-campus friends, and belonging on campus, and the person variable of extracurricular activities. The research evidence indicates that each of these variables has been linked to one or more of the outcome variables of academic achievement, social adjustment, and intention to persist. Each variable is reviewed separately, and research that connects the college microsystem variables to any of the psychological processes variables is also discussed.

Relatedness to on-campus friends

As mentioned earlier in the section on peer relatedness, college students tend to interact with on-campus and off-campus peers. In particular, Fischer (2007) in her study of data from the National Longitudinal Survey of Freshmen obtained results suggesting that on- and off-campus friendships with peers may differ in their relationships to students' grades and retention. For Black and White students, having more ties off-campus was negatively related to their grades and retention, and, for all ethnic groups, having more informal ties on campus was related to retention. Because of the different relationships between relatedness to on- and off-campus friends and the outcome variables of academic achievement, social adjustment, and intention to persist in college, I examined relationships with relatedness to on-campus friend separately from relatedness to off-campus friends to see if differences exist in my analysis. Because informal on-campus ties have been related to persistence (Fischer, 2007), in my model I hypothesized that

relatedness to on-campus friends predicts intention to persist. I also predicted that on-campus relatedness to friends is related to social adjustment because of the research mentioned earlier in the section on off-campus friends linking friends to social adjustment (Buote et al., 2007; Friedlander et al., 2007). I also hypothesized that relatedness to on-campus friends predicts social adjustment and intention to persist.

Relatedness to instructors

Teacher-student relationships have always been an important research topic in elementary and secondary education. Instructor-student relationships have not been as thoroughly researched at the college level. Some researchers have examined students' relatedness to their instructor and found positive relationships. Larose, Tarabulsy, and Cyrenne (2005) examined relatedness as a moderating factor in mentoring relationships and student adjustment for 40 first-year college students. Participants were 40 students from a private college who were identified as at-risk on the basis of low grades in high school. The mean age of the participants was 18.6 years, and 72% were female. All participants received 10 hours of mentoring from an instructor. Before beginning the mentoring program participants' social adjustment was assessed with the SACQ (Baker & Siryk, 1984) to measure adjustment. After completing the 10-hour mentoring program, participants completed an adapted version of the Inventory of Parent and Peer Attachment (IPPA; Armsden & Greenberg, 1987), a measure of their perceived relatedness to their mentor. Five months after completing the mentoring program, the SACQ was re-administered to participants. The results showed that students with high relatedness with their mentors had better social adjustment and institutional attachment compared to students with low relatedness and students who did not go through the mentoring program. Those students who had low relatedness were less well-adjusted to college and received lower grades. The researchers found that students with high relatedness reported better social adjustment and institutional attachment. Students

with low relatedness reported worse academic and emotional adjustment. Larose et al. highlighted the potential positive effects of students' relatedness to their instructor; however, they assessed relatedness to mentors, not relatedness to instructors. All of the mentors were instructors, but this study examined the mentoring relationship in particular. I examined relatedness to instructor instead of relatedness to mentors.

In her study comparing college outcomes by ethnic group, Fischer (2007) assessed formal academic ties with professors by asking students how often they asked questions in class and after class, asked questions when information was unclear, visited professors in their office to ask questions, and visited professors in their office to talk. Results indicated that more connections with professors were related to higher GPA for all ethnic groups ($\beta = .07, p < .001$ for White students, $\beta = .06, p < .01$ for Asian students, $\beta = .09, p < .001$ for Hispanic students, and $\beta = .04, p < .10$ for Black students). These relationships though modest suggest that positive relationships with instructors contribute to students' GPA. One study has linked relatedness to instructor to perceived academic self-efficacy. In a study of 172 community college students, Cordell-McNulty and Ashton (2008) assessed students' sense of relatedness to their instructors with four items from a scale developed by Furrer and Skinner (2003) and perceived academic self-efficacy using the MSLQ (Pintrich et al., 1991). Confirmatory factor analysis showed that relatedness to instructor loaded on two factors identified as Instructor Acceptance and Ignored by Instructor. Perceived academic self-efficacy also loaded on two factors identified as Perceived Self-Efficacy Outcome and Perceived Self-Efficacy Mastery. Perceived Self-Efficacy Mastery consisted of five items measuring students' belief that they can master the course content. Perceived Self-Efficacy Outcome consisted of three items measuring students' belief in their ability to achieve a successful outcome in the course. Results showed that Instructor Acceptance

predicted both Perceived Self-Efficacy Outcome ($F = 5.00, p < .05$) and Perceived Self-Efficacy Mastery ($F = 5.16, p < .05$). Though the researchers measured perceived self-efficacy and not achievement, academic self-efficacy has been linked with academic outcomes (Bembenutty, 2007; Multon et al., 1991).

Research has linked relatedness to instructor with academic achievement (Fischer, 2007; Larose et al., 2005), social adjustment (Larose et al., 2005), and perceived academic self-efficacy (Cordell-McNulty & Ashton, 2008). In my model, I hypothesized positive relationships between relatedness to instructor and academic achievement, social adjustment, and perceived academic self-efficacy.

Belonging on campus

Sense of belonging refers to the feeling that one is valued as a part of the environment (Hagerty, Lynch-Saucer, Patusky, Bouwsema, & Collier, 1992). Belonging on campus is feeling a part of the campus environment. Many college retention studies include sense of belonging, but it is often combined with other factors including institutional fit and commitment (Hausmann, Schofield, & Woods, 2007). Hurtado and Carter (1997) and Hausmann et al. argued that a sense of belonging on campus needs to be examined in research as a separate construct from active involvement in the community. Hurtado and Carter and Hausmann et al. also suggested that belonging to campus might be an important contributor to minority adolescents' persistence and achievements in college in particular.

In a study of the contribution of campus climate to adjustment, Mounts (2004) examined sense of belonging on campus and college adjustment in a sample of 319 college freshmen. Sense of belonging was measured using the sense of belonging subscale of the Perceived Cohesion Scale (PCS; Bollen & Hoyle, 1990). Anxiety and depression were measured using the Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988) and the Beck Depression

Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). For White adolescents a higher sense of belonging on campus was related to lower levels of anxiety ($\beta = -.14, p < .05$), and for African American adolescents a higher sense of belonging on campus was related to lower levels of depression ($\beta = -.41, p < .001$), indicating that sense of belonging is related to adjustment, but the relationships may differ for different ethnic groups. Because sense of belonging was negatively related to anxiety and depression, it is likely that sense of belonging is positively related to social adjustment in college students. In a study of 324 students at a small liberal arts college Ostrove and Long (2007) also found a link between sense of belonging and social adjustment. Sense of belonging was measured using 1-item from the SACQ (Baker & Siryk, 1999), "I feel that I fit in well as part of the college environment," and another item the authors created, "Overall, to what extent do you feel you belong at [college name]." Cronbach's alpha was .85 for this 2-item measure. Social adjustment was measured using the social adjustment subscale of the SACQ, minus the one item used to assess sense of belonging. Results indicated that sense of belonging was significantly related to social adjustment ($\beta = .58, p < .001$). These studies emphasize the relationship of sense of belonging to social adjustment.

Hausmann et al. (2007) examined sense of belonging and intention to persist in 365 first-year college students from a large mid-Atlantic university. Sense of belonging was measured using the sense of belonging subscale of the PCS (Bollen & Hoyle, 1990). Persistence was measured by asking students whether they intended to complete their degree at their institution. Results showed that sense of belonging predicted intention to persist at the beginning of the year (parameter estimate = .30, $p < .001$); however, sense of belonging declined significantly over the year. The authors argued that as students progress through the school year the practicality of getting a college degree may become more important than sense of belonging in determining

intention to persist. Even though Hausmann et al. found that sense of belonging decreased as students progressed through their first year of college, I hypothesized that sense of belonging predicts college student persistence.

In relation to perceived self-efficacy, Freeman, Anderman, and Jensen (2007) examined sense of belonging in 238 college freshmen at a university in the southeast, using the perceived self-efficacy subscale of the MSLQ (Pintrich et al., 1991). To measure sense of class belonging, an adapted version of the Psychological Sense of School Membership (PSSM; Goodenow, 1993) was used. Results indicated that students' sense of class belonging was strongly associated with perceived academic self-efficacy adjustment ($\beta = .58, p < .001$). In my model I hypothesized that sense of belonging predicts perceived academic self-efficacy.

Recently, Rodgers and Summers (2008) proposed a revision to Bean and Eaton's (2000) model for examining the retention of African American students at predominantly White institutions. In particular, they proposed that attitudes precede rather than follow the psychological processes, so sense of belonging directly affects all the psychological process variables: self-efficacy, goal orientations, attributions, and intrinsic motivation. Because of this theoretical relationship proposed in the Rodgers and Summers model, I hypothesized that sense of belonging is positively related to Commitment Making, Identification with Commitment, mastery goals, and perceived academic self-efficacy and is negatively related to performance-avoid goals. Research has also linked sense of belonging with adjustment (Mounts, 2004; Ostrove & Long, 2007), intention to persist (Hausmann et al., 2007), and perceived academic self-efficacy (Freeman et al., 2007). Consistent with these studies, in my model I hypothesized that sense of belonging predicts perceived academic self-efficacy, social adjustment, and intention to persist.

Extracurricular activities

Involvement in extracurricular activities may also be an important predictor of college attrition. Numerous researchers have reported that student involvement in extracurricular activities is positively related to educational aspirations, bachelor's degree attainment, and graduate school attendance (Moore, Lovell, McGann, & Wyrick, 1998). In a study of 172 community college students, Cordell-McNulty and Ashton (2008) found that participation in extracurricular activities predicted GPA ($F = 4.64, p < .03$). In a longitudinal study of 695 participants from middle school through age 20, Mahoney, Cairns, and Farmer (2003) found that consistent participation in extracurricular activities was positively associated with educational status at age 20, suggesting that the more students are academically and socially involved, the more they are likely to graduate. Participation in extracurricular activities may be especially important during students' first year of college when relationships and affiliations are forming (Tinto, 2005). In her study of college outcomes, Fischer (2007) used data from the National Longitudinal Survey of Freshmen. Equal numbers of White, Black, Hispanic, and Asian students were sampled from each college resulting in a total of 3,924 participants. Outcome variables for this study were college GPA and whether students left their initial college by the end of their junior year. Fischer found that for minority students, greater involvement in formal social activities as measured by extracurricular activities and volunteering, was weakly related to higher grades ($\beta = .08, p < .05$ for Asian students, $\beta = .17, p < .001$ for Hispanic students, and $\beta = .11, p < .01$ for Black students). However, greater involvement in extracurricular activities was strongly negatively related to leaving college for minority students ($\beta = -1.89, p < .05$ for Asian students, $\beta = -1.80, p < .001$ for Hispanic students, and $\beta = -1.87, p < .05$ for Black students). These studies show a weak positive relationship between participation in extracurricular activities and GPA but a strong positive relationship with persistence.

Bohnert, Aikins, and Edidin (2007) examined the relationship between extracurricular activities and social adaptation during the transition to college in 85 adolescents who completed measures during the summer before their first year in college (Time 1) and towards the end of their first year in college (Time 2). Extracurricular activities were measured by the number of activities students participated in (breadth) and the number of hours each week students spent on extracurricular activities (intensity). Friendship quality was assessed using the Friendship Quality Questionnaire (FQQ; Parker & Asher, 1993). Loneliness and social dissatisfaction were assessed using the Loneliness and Social Dissatisfaction Questionnaire (Asher & Wheeler, 1985). The researchers found that the number of hours a student participated in extracurricular activities each week (intensity) was significantly correlated with friendship quality ($r = .27, p < .05$) and loneliness ($r = -.27, p < .05$). The number of activities a student participated in each week (breadth) was negatively correlated with loneliness ($r = -.23, p < .05$).

In summary, previous research demonstrates relationships between participation in extracurricular activities and academic achievement (Cordell-McNulty & Ashton, 2008; Fischer, 2007), social adaptation (Bohnert et al., 2007), and intention to persist (Fischer, 2007; Moore et al., 1998). On the basis of these studies, in my model I hypothesized that involvement in extracurricular activities predict academic achievement, social adjustment, and intention to persist.

The Self-System

Research suggests that several student characteristics are related to success during college. Because of the importance of the person in college success, I examined the self-system. The self-system in this study consists of the person variables of personality and academic ability, and the process variable of theory of intelligence. The research evidence indicates that each of these variables has been linked to one or more of the outcome variables of academic

achievement, social adjustment, and intention to persist. Each variable is reviewed separately, and research that connects these self-system variables to any of the psychological processes variables is also discussed.

Personality

Personality, in particular the five-factor model of personality, has often been linked with academic outcomes (Nguyen, Allen, & Fraccastoro, 2005; Wolfe & Johnson, 1995). The five-factor model is one of the most popular conceptions of personality traits. The model is composed of Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness. Extraversion refers to being assertive, active, enthusiastic, and energetic. Agreeableness refers to being cooperative, generous, appreciative, and trustful. Conscientiousness refers to being responsible, orderly, organized, and reliable. Neuroticism refers to being anxious, tense, and unstable and Openness refers to being imaginative, artistic curious, and insightful (John & Srivastava, 1999; McCrae & John, 1992). Of these five personality factors, conscientiousness has been consistently shown to predict academic achievement. Nguyen et al. investigated the relationship between the five-factor model and college GPA. Participants were 360 undergraduate and graduate students at a Southern university. Personality was measured using the Big 5 Personality Inventory developed by Goldberg (1999). They found that conscientiousness was a stronger predictor of overall GPA than the other four personality traits ($t = 2.916, p < .01$). In a similar study, Wolfe and Johnson examined personality and college outcome in 201 undergraduate students at a state university in New York. Personality was measured using the Big Five Inventory (John, Donahue, & Kentle, 1991). Wolfe and Johnson found that conscientiousness was the second strongest predictor of college GPA ($\beta = .31$), after average grade earned in high school ($\beta = .43$). Because of this research linking conscientiousness as a strong predictor of academic achievement, I examined the relationship of conscientiousness to GPA in my study.

Numerous studies linking personality and identity have been conducted. For example, Luyckx et al. (2005) examined personality and identity with 565 freshmen in educational psychology classes in a university in Belgium, using the Utrecht-Groningen Identity Development Scale (U-GIDS; Meeus & Dekovic, 1995) to assess Identification with Commitment and Exploration in Depth and the Ego Identity Process Questionnaire (EIPQ; Balistreri et al., 1995) to assess Commitment Making and Exploration in Breadth. Conscientiousness and openness were assessed using the Dutch version of the NEO-FFI (Hoekstra et al., 1996). In relationship to the five identity categories Luyckx et al. found that college students in the Achievement category were high on conscientiousness ($M = 3.58$) and openness ($M = 3.60$). Students in the Foreclosure category were high on conscientiousness ($M = 3.53$), but low on openness ($M = 3.35$). Students in Moratorium were low on conscientiousness ($M = 3.37$), but high on openness ($M = 3.60$). Students in both the Diffused Diffusion and Carefree Diffusion categories scored low on both conscientiousness ($M = 3.13, 3.27$) and openness ($M = 3.48, 3.37$). All these means were significantly different from other means. These results are consistent with what is expected in each identity status. In a study examining the relationship between identity status and personality, Clancy and Dollinger (1993) examined all five personality traits in 198 undergraduates at a large Midwestern university. Identity was measured using the Extended Objective Measure of Ego Identity Status (EOM-EIS; Adams, Bennion, & Huh, 1989), and personality was measured using the NEO Personality Inventory (NEO-PI; Costa & McCrae, 1992). They found a significant positive relationship between conscientiousness and Identity Achievement ($r = .30, p < .001$), and significant negative relationships between conscientiousness and Moratorium ($r = -.22, p < .001$) and Diffusion ($r = -.38, p < .001$). These results are consistent with the findings of Luyckx et al.

In another study of personality and identity, Luyckx, Soenens, and Goossens (2006) examined the relationship between personality and identity in 351 college women at a university in Belgium. The U-GIDS (Meeus & Dekovic, 1995) was used to assess Identification with Commitment, and the EIPQ (Balistreri et al., 1995) was used to assess Commitment Making and Exploration in Breadth. Personality was assessed using the Dutch version of the NEO-FFI (Hoekstra et al., 1996). The researchers found that Commitment Making and Identification with Commitment were negatively related to neuroticism and positively related to extraversion, agreeableness, and conscientiousness. Using structural equation modeling they reported that conscientiousness at Time 1 positively predicted Commitment Making at Time 3 ($\beta = .09, p < .05$) and positively predicted Identification with Commitment at Time 5 ($\beta = .12, p < .05$). The major weakness of this study is that all participants were female, so these results cannot be generalized to male college populations. These studies all indicate a strong relationship between identity and personality and in particular a relationship between conscientiousness and Identity Achievement.

In previous research conscientiousness has been associated with academic achievement (Nguyen et al., 2005; Wolfe & Johnson, 1995), identity achievement (Clancy & Dollinger, 1993; Luyckx et al., 2005), and Commitment Making and Identification with Commitment (Luyckx et al., 2006). In my model I hypothesized that conscientiousness is positively associated with academic achievement, Commitment Making, and Identification with Commitment.

Theory of intelligence

Implicit theories of intelligence refer to the way people understand their own intelligence. Dweck (1999) proposed two types of implicit theories of intelligence: entity and incremental. Entity theorists believe that their intelligence is fixed and cannot be changed. In contrast, incremental theorists believe that intelligence is malleable and can be increased. Entity theorists

often have performance goals and make attributions of success and failure to ability; in contrast, incremental theorists often have mastery goals and make attributions of success and failure to effort or lack of effort (Dweck, 1999). Dweck examined college students' implicit theories of intelligence and whether they wanted to be challenged or receive a good grade in a course. Sixty-eight percent of the incremental theorists wanted to be challenged versus only 35% of entity theorists, indicating that students with an incremental theory of intelligence are more likely to endorse mastery goals and students with an entity theory of intelligence are more likely to endorse performance goals.

Aronson, Fried, and Good (2002) conducted an experimental study where they attempted to manipulate African American and Caucasian students' theories of intelligence. Participants were 79 undergraduates at Stanford University, who were randomly assigned to one of six conditions. For each ethnicity there was a malleable pen pal group, a control pen pal group, and a non pen pal group. Both pen pal groups were told that they were writing letters to a struggling middle-school student. The malleable group viewed a presentation about how new research has shown that intelligence is not fixed. The control pen pal group viewed a presentation about how everyone has intellectual strengths and weaknesses. Both groups then wrote letters to the pen pals and gave presentations about what they wrote. Several days later the participants completed a measure about their theories of intelligence. Nine weeks later the participants again completed a measure about their theories of intelligence, and their semester grades were obtained. Results indicated that both African American and Caucasian students in the malleable pen pal groups had higher GPAs than students in the control groups. For African Americans the differences between the malleable pen pal group and the control pen pal group ($t = 2.19, p < .05$) and the non pen pal group ($t = 2.24, p < .05$) in GPA were significant. For Caucasians the differences between the

malleable pen pal group and the control pen pal group ($t = 1.76, p < .09$) and the non pen pal group ($t = 1.82, p < .08$) in GPA were marginally significant. However, the researchers did not measure persistence, so we do not know if incremental beliefs would eventually impact persistence.

However, Zuckerman, Gagne, and Nafshi (2001) examined the relationship between students' implicit beliefs about their major and students' persistence in their choice of a major. Participants were 186 undergraduates at the University of Rochester. Entity beliefs were measured with a scale the authors created. A sample item is "one's interests are what they are; they cannot be changed to fit a particular major." There was a significant entity by perceived competence interaction ($F = 6.83, p < .01$), which indicated that students with entity beliefs who believed they were not doing well in their major were more likely to choose a new major than were incremental theorists who were also not doing well in the major. However, the researchers measured persistence in the major, not persistence in college.

Robins and Pals (2002) examined the implicit self-theories of college students in the academic domain with data from the Longitudinal Study of Self and Personality Development. Participants were 363 undergraduate students at the University of California at Berkeley. Data were collected throughout the 4 years of college. Implicit self-theories were measured with five items adapted from Erdley and Dweck (1993). Performance and learning goal orientations were assessed with items the authors created. Cronbach's alphas for the performance and learning goal orientation scales were .84 and .78 respectively. Affective response to academic achievement was measured using the Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1998). Results indicated that entity theorists were more likely to endorse performance goals and experience negative affect about their academic performance. In contrast, incremental

theorists were more likely to endorse learning goals and experience positive affect about their academic performance. Path analysis was also used to test the overall implicit self-theories model. The final model the authors tested was significant and had a good fit to the data. In the model, entity orientation had a direct effect ($r = .30, p < .05$) on performance goals and a direct negative effect on learning goals ($r = -.26, p < .05$).

In summary, entity beliefs about intelligence have been found to be negatively related to GPA (Aronson et al., 2002), persistence (Zuckerman et al., 2001), and mastery goals and positively related to performance goals (Robins & Pals, 2002). Consistent with those relationships I hypothesized in my model a negative relationship between entity beliefs and mastery goals, GPA, and intention to persist. I also hypothesized a positive relationship between entity beliefs and performance-avoid goals.

Previous academic achievement

Previous academic achievement (SAT scores and high school GPA) is often used as a predictor of college retention (Robbins et al., 2004). In their meta-analysis of 109 studies of college outcomes, Robbins et al. found that high school GPA, SAT, and ACT scores predicted retention and GPA in a study of college students. Robbins, Allen, Casillas, Peterson, and Le (2006) conducted a large-scale study of college outcomes in 14,464 students from 48 2- and 4-year colleges in the U.S. The researchers found that the ACT composite score and high school GPA predicted retention and college GPA in 2- and 4-year institutions (for retention, odds ratio = 1.24, $p < .03$ for ACT scores at 2-year institutions, odds ratio = 1.28, $p < .001$ for ACT scores at 4-year institutions, odds ratio = 1.24, $p < .001$ for high school GPA at 2-year institutions, and odds ratio = 1.25, $p < .001$ for high school GPA at 4-year institutions, and for college GPA, $\beta = .18, p < .001$ for ACT scores at 2-year institutions, $\beta = .30, p < .001$ for ACT score at 4-year institutions, $\beta = .24, p < .001$ for high school GPA at 2-year institutions, and $\beta = .28, p < .001$ for

high school GPA at 4-year institutions) at 2- and 4- year institutions. In a study examining predictors of college performance, Elias and MacDonald (2007) examined the relationship of prior achievement on college achievement in 202 undergraduates. Results indicated that high school GPA predicted college GPA ($\beta = .38, p < .001$). In a comparison of college outcomes for different ethnic groups, Fischer (2007) used data from the National Longitudinal Survey of Freshmen. Equal numbers of White, Black, Hispanic, and Asian students were sampled from each college resulting in a total of 3,924 participants. Results showed that, for all students, high school GPA significantly predicted college GPA. In another study, Mattson (2007) also found that high school GPA was significantly related to academic success in 591 students who were identified as being at risk at a highly selective, private research university in the Southwest. Students were identified as high risk if they had a low high school GPA or low standardized test scores. Results indicated that high school GPA was significantly correlated with first-semester college GPA ($r = .18, p < .01$) and first-year college GPA ($r = .20, p < .01$). In summary, the studies show that high school GPA predicts college GPA.

In sum previous academic achievement has been linked with academic achievement in college (Elias & MacDonald, 2007; Fischer, 2007; Mattson, 2007; Robbins et al., 2004; Robbins et al., 2006) and college retention (Robbins et al., 2004; Robbins et al., 2006). On the basis of these studies I hypothesized that previous academic achievement in high school predicts college GPA in my model.

The Macrosystem

In 2002-2003, women earned over 57% of all bachelor's degrees, and Caucasian students earned 70% of all bachelor's degrees (National Center for Education Statistics, 2005a). Many researchers have noted that gender, ethnicity, and SES are often predictors of college success

(Astin, 1997; Fischer, 2007). In this study I examined the context variables of gender, ethnicity, and socioeconomic status within the macrosystem.

Gender

Gender, when included as a predictor variable, is significantly related to college success. Astin (1997) pointed out that gender is one of the factors that colleges can use to predict the retention rate of their students. Robbins et al. (2006) in a study of 14,464 students from 48 2- and 4-year colleges in the U.S. found that gender predicted college GPA ($\beta = -.12, p < .001$ for 4-year institutions and $\beta = -.07, p < .07$ for 2-year institutions), with females having higher GPAs than males. In a study of 172 community college students, Cordell-McNulty and Ashton (2008) also found that gender predicted GPA ($F = 3.83, p < .05$) with females having higher self-reported GPAs than male students. Examining predictors of success in students at-risk at a highly selective, private research university in the Southwest, Mattson (2007) found that gender was significantly related to academic success in 591 students with a low high school GPA or low standardized test scores. Results indicated that gender was significantly correlated with first-semester college GPA ($r = .16, p < .01$) and first-year college GPA ($r = .19, p < .01$), indicating that females had higher college GPAs than males. Using data from the National Longitudinal Survey of Freshmen, Fischer (2007) sampled equal numbers of White, Black, Hispanic, and Asian students from each college resulting in a total of 3,924 participants. Outcome variables for this study were college GPA and whether students left their initial college by the end of their junior year. For all students, being male was negatively related to cumulative college GPA. This relationship was significant for White ($\beta = -.07, p < .01$), Hispanic ($\beta = -.11, p < .05$), and Black males ($\beta = -.10, p < .001$). All these studies show that being female predicts higher GPA. One recent study linked college success with males. Gupta, Harris, Carrier, and Cohen (2006) examined predictors of success of 451 undergraduates in an upper-level mathematics course at a

public university in the Northeast. Results indicated that gender was a significant predictor of final course grade with male students receiving higher grades. This result suggests that in some courses or perhaps majors, male students may outperform female students, but female students are more likely to have higher cumulative college GPAs than male students.

Several studies have indicated that females have higher cumulative GPAs in college than males (Cordell-McNulty & Ashton, 2008; Fischer, 2007; Mattson, 2007; Robbins et al., 2006). On the basis of these studies I controlled for gender in my model.

Ethnicity

In her examination of college outcomes by ethnicity in 3,924 students from four ethnic groups, Fischer (2007) argued that when examining college outcomes and adjustment, ethnicity cannot be ignored because minority students experience college differently. Astin (1997) argued that ethnicity is one of the factors that can be used to help colleges predict the expected retention rate of their students. In a study of college outcomes, Robbins et al. (2006) examined 14,464 students from 48 2- and 4-year colleges in the U.S. and found that ethnicity predicted college GPA at both 2- ($p < .001$) and 4- year institutions ($p < .001$). In a study of social support and perceived academic self-efficacy in 172 community college students, Cordell-McNulty and Ashton (2008) found that ethnicity was a significant predictor of GPA ($F = 8.40, p < .0001$), with White students and students who identified themselves as other, having higher GPAs than Black and Hispanic students. On the basis of these studies linking ethnicity to academic achievement in college (Cordell-McNulty & Ashton, 2008; Robbins et al., 2006), I controlled for ethnicity in my model.

Socioeconomic status

SES is often included as a predictor of college outcomes. In their meta-analysis of 109 studies examining psychosocial and study-skill factors and their relationship to college

outcomes, Robbins et al. (2004) found that SES positively predicted retention and college GPA. In their study of college outcomes, Robbins et al. (2006) examined 14,464 students from 48 2- and 4-year colleges in the U.S. and found that SES predicted retention (odds ratio = 1.12, $p < .001$) and college GPA ($\beta = -.80$, $p < .001$) at 4-year institutions with students with higher SES having higher GPAs and persistence. Of note, SES was not a significant predictor of GPA or persistence at 2-year colleges. A possible reason for this finding is that there was less variation in SES at 2-year colleges than in the 4-year sample. Fischer (2007) used data from the National Longitudinal Survey of Freshmen to examine differences in college outcomes by ethnicity. Equal numbers of White, Black, Hispanic, and Asian students were sampled from each college resulting in a total of 3,924 participants. Results indicated having a family income of more than \$75,000 a year significantly predicted college GPA for White ($\beta = .06$, $p < .05$) and Hispanic students ($\beta = .09$, $p < .05$). Overall higher SES levels tend to predict GPA and persistence; however, this relationship may differ by type of institution. In particular, Robbins et al. (2006) did not find a significant relationship between SES and GPA or retention for college students at 2-year institutions. In light of the studies indicating a relationship between SES and academic achievement in college (Fischer, 2007; Robbins et al, 2004; Robbins et al., 2006) and college retention (Robbins et al., 2004; Robbins et al., 2006), I planned to control for SES in my model.

The Chronosystem

Age is often a predictor of college success. Because of the importance of age, this study will examine the chronosystem time variable of age. It is reasonable to assume that as students age and progress through college they will become more independent. Studies have shown that older students tend to receive higher course grades (Gupta et al., 2006) and higher GRE scores (Awad, 2007). Gupta et al. examined predictors of success in 451 undergraduates in an upper-level mathematics course at a public university in the Northeast. Results indicated that age was a

significant predictor of final course grade with older students receiving higher grades. Awad (2007) examined 313 African American students from a historically Black college in the Northeast to identify variables that predict GPA and GRE scores. Students completed the GRE verbal subtest. Results showed that the only significant predictor of GRE scores was age ($\beta = .18, p < .05$), with older students having higher scores. On the basis of these studies showing a relationship between age and academic achievement (Awad, 2007; Gupta et al., 2006), I excluded all students over the age of 26.

Purpose of the Study

The purpose of this study was to test a model of college success and retention based on a bioecological perspective (Bronfenbrenner & Morris, 1998). This new bioecological systems model of college retention focuses on the ecological systems (family, peer, college, and the self-system) that predict college success and the psychological processes (identity, perceived academic self-efficacy, and achievement goals) that mediate the relationship between the ecological systems and college success. See Figure 1 for an illustration of the conceptual model.

The hypotheses I proposed to test based on my review of the literature are represented in Table 1-1. Specifically, parental autonomy support, instructor relatedness, on-campus friend relatedness, sense of belonging, extracurricular activities, and entity beliefs have a direct relationship to intention to persist. Parental involvement, instructor relatedness, and sense of belonging directly affect academic self-efficacy which in turn, directly affects intention to persist. Parental autonomy support, parental relatedness, sense of belonging, and conscientiousness directly affect commitment making which also directly affects intention to persist. Parental autonomy support, sense of belonging, and conscientiousness directly affect identification with commitment which directly affects intention to persist. Parental involvement, parental autonomy support, instructor relatedness, extracurricular activities, entity beliefs, and

conscientiousness directly affect academic achievement which affects intention to persist. Commitment making, identification with commitment, perceived academic self-efficacy, mastery goals, and performance-avoid goals directly affect academic achievement. Sense of belonging and entity beliefs affect performance-avoid goals, which directly affect academic achievement. Parent relatedness, sense of belonging, and entity beliefs directly affect mastery goals, which directly affect academic achievement. Perceived academic self-efficacy directly affects mastery goals. Parental autonomy support, off-campus friend relatedness, instructor relatedness, on-campus friend relatedness, sense of belonging, and extracurricular activities directly affect social adjustment, which in turn, affects intention to persist. Perceived academic self-efficacy, commitment making, identification with commitment, mastery goals, and performance-avoid goals directly affect social adjustment.

This model addresses weaknesses in the literature by combining the sociological and psychological perspectives that are commonly used in the literature on college retention. In addition, this model uses Bronfenbrenner and Morris's (1998) bioecological theory as a framework for examining college retention. Unlike many previous studies, I tested the entire conceptual model, instead of isolated sections.

Research Hypotheses

- Hypothesis 1. Academic achievement, social adjustment, perceived academic self-efficacy, commitment making, identification with commitment, parental autonomy support, relatedness to instructors, relatedness to on-campus friends, sense of belonging, extracurricular activities, and entity beliefs predict intention to persist.
- Hypothesis 2. Perceived academic self-efficacy, commitment making, identification with commitment, mastery goals, performance-avoid goals, parental involvement, parental autonomy support, relatedness to instructors, extracurricular activities, entity beliefs, and conscientiousness predict academic achievement.
- Hypothesis 3. Perceived academic self-efficacy, commitment making, identification with commitment, mastery goals, performance-avoid goals, parental autonomy support,

relatedness to off-campus friends, relatedness to instructors, relatedness to on-campus friends, extracurricular activities, and sense of belonging predict social adjustment.

- Hypothesis 4. Perceived academic self-efficacy, relatedness to parents, sense of belonging, and entity beliefs predict mastery goals.
- Hypothesis 5. Perceived academic self-efficacy, sense of belonging, and entity beliefs predict performance-avoid goals.
- Hypothesis 6. Parental involvement, relatedness to instructors, and sense of belonging predict perceived academic self-efficacy.
- Hypothesis 7. Parental autonomy support, relatedness to parents, sense of belonging, and conscientiousness predict commitment making.
- Hypothesis 8. Parental autonomy support, sense of belonging, and conscientiousness predict identification with commitment.

Theoretical Significance

Researchers have proposed several models of college retention (Bean & Eaton, 2000; Tinto, 1975, 1993), but they have not conducted adequate tests of these models. Most studies of college retention focus on relatively few variables and lack a theoretical focus that integrates the variables into a coherent framework. My dissertation is the first study to use Bronfenbrenner and Morris's (1998) bioecological theory as a theoretical framework for creating and testing a conceptual model of student retention in college. This model includes variables from five social contexts (person, family, peers, school, and culture) that have been shown to predict GPA and persistence to graduation. The theoretical significance of this dissertation is that it will advance the study of college retention by providing a cohesive structure for the identification and testing of relationships among the variables that are likely to contribute to students' retention in college.

Practical Significance

The failure of a significant proportion of students who enter college to complete their programs is a serious problem. Estimates suggest that almost 50% of students do not complete their college programs within 5 years (National Center for Higher Education Management

Systems, 2007). The practical significance of my dissertation is that it might provide researchers and higher education administrators with information on variables that might increase college students' timely completion of their degrees. The value of the bioecological perspective is that it suggests variables from several social contexts—the person, the home, the school, the culture, and peers—that might improve students' persistence to graduation. Programs that combine influences from each of these social contexts might be more effective than programs that focus on only one context, typically the school. By examining a more comprehensive set of predictor variables, I may be able to identify variables from these different contexts that contribute to retention of students to graduation. I hope that my study will offer insights for the design of experimental studies that show that innovative programs that combine factors from multiple social contexts are more effective in increasing college students' retention than programs that focus on a single social context.

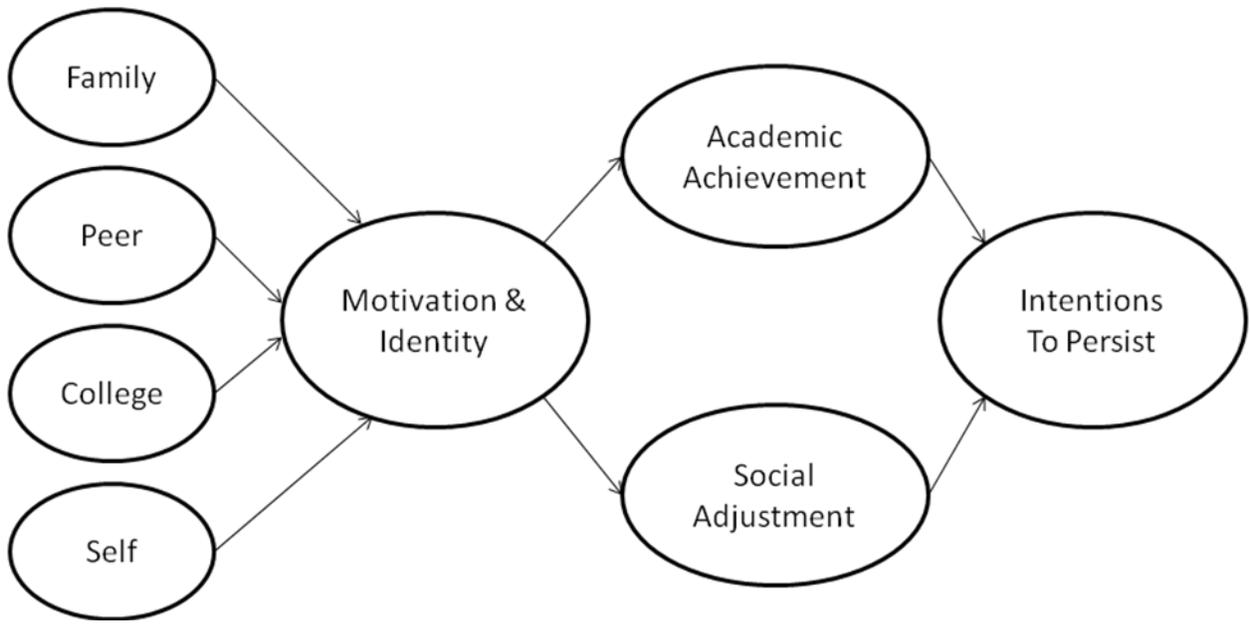


Figure 1-1 Proposed Bioecological Model of College Student Retention

Table 1-1 Proposed relationships in the model

	Commitment Making	Identification with Commitment	Mastery Goals	Performance-Avoid Goals	Perceived Academic Self-Efficacy	GPA	Social Adjustment	Intention to Persist
Parental Involvement					*	*		
Parental Relatedness	*		*					
Parental Autonomy Support	*	*				*	*	*
Off-Campus Friend Relatedness							*	
Instructor Relatedness					*	*	*	
On-Campus Friend Relatedness							*	*
Sense of Belonging	*	*	*	*	*		*	*
Extracurricular Activities						*	*	*
Conscientiousness	*	*				*		
Entity Beliefs			*	*		*		*
Commitment Making						*	*	*
Identification with Commitment						*	*	*
Mastery Goals						*	*	
Performance-Avoid Goals						*	*	
Perceived Academic Self-Efficacy			*			*	*	*
GPA								*
Social Adjustment								*

CHAPTER 2 METHOD

The purpose of this study was to test a new model of college retention that focused on the relationships among the family, peer, and college microsystems, the self-system, the psychological processes of identity, goal orientations, and perceived academic self-efficacy, and the outcome variables, academic achievement, social adjustment, and intention to persist.

Participants

Participants were 299 college students from a large southeastern university. At the university, students were recruited from educational psychology classes and received course credit for their participation. All participants completed the survey online.

Instruments

Predictor Variables

Identity

Identity was measured using the Commitment Making and Identification with Commitment subscales of the Dimensions of Identity Development Scale (DIDS; Luyckx et al., 2008). This 25-item instrument measures the five identity dimensions, Commitment Making, Identification with Commitment, Exploration in Breadth, Exploration in Depth, and Ruminative Exploration. Participants responded the items using a 5-point Likert scale ranging from 0 (*strongly disagree*) to 4 (*strongly agree*). Sample items for Commitment Making include “Know what I want to do with my future,” and “Made a choice concerning some of my plans for the future.” Sample items for Identification with Commitment include “Future plans give me self-confidence,” and “Sense that the direction I want to take in life will really suit me.” In the Luyckx et al. (2008) study a sample of 263 Caucasian freshmen college students from a university in Belgium completed the 25-item measure. This sample was 72.6% female, and the

mean age was 19.14 years. Cronbach's alphas were .86 for Commitment Making, .86 for Identification with Commitment, .81 for Exploration in Breadth, .79 for Exploration in Depth, and .86 for Ruminative Exploration. Luyckx et al. (2008) conducted a confirmatory factor analysis to determine if the data would fit a five-factor model consistent with the proposed dimensions. The data did fit the five-factor model with a Satorra-Bentler scaled chi-square of 658.93, RMSEA = .07, and CFI = .94.

Luyckx et al. (2008) conducted a cluster analysis of the identity statuses. Six clusters emerged: Achievement, Diffused Diffusion, Carefree Diffusion, Ruminative Moratorium, Foreclosure, and Undifferentiated. The Achievement cluster scored high on Commitment Making and Identification with Commitment, moderately high on Exploration in Breadth and Exploration in Depth, and low on Ruminative Exploration. The Diffused Diffusion cluster scored low on Commitment Making and Identification with Commitment, intermediate on Exploration in Breadth and Exploration in Depth, and high on Ruminative Exploration. The Carefree Diffusion cluster scored low on Commitment Making, Identification with Commitment, Exploration in Breadth, and Exploration in Depth, and intermediate on Ruminative Exploration. The Ruminative Exploration cluster scored low on Commitment Making and Identification with Commitment, and high on Exploration in Breadth, Exploration in Depth, and Ruminative Exploration. The Foreclosure cluster scored high on Commitment Making and Identification with Commitment, and low on Exploration in Breadth, Exploration in Depth, and Ruminative Exploration. The Undifferentiated cluster scored intermediate on all dimensions except Exploration in Breadth, which was moderately high.

As evidence of construct validity, participants' scores on the DIDS clusters were related to their scores on measures of self-esteem, depressive symptoms, anxiety symptoms, self-

reflection, and self-rumination. Self-esteem was assessed using the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965). Depressive symptoms were assessed using 12 items of the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977). Anxiety symptoms were assessed using the revised Symptom Checklist (SCL-90-R; Arrindell & Ellema, 1986). Self-reflection and self-rumination were assessed using the Rumination-Reflection Questionnaire (RRQ; Trapnell & Campbell, 1999). For self-esteem, the Achievement and Foreclosure clusters scored the highest and the Diffused Diffusion and Ruminative Moratorium clusters scored the lowest. For depression and anxiety symptoms, the Achievement, Foreclosure, and Carefree Diffusion clusters scored the lowest and the Diffused Diffusion and Ruminative Moratorium clusters scored the highest. For self-reflection, the Achievement and Ruminative Moratorium clusters scored the highest and the Carefree Diffusion cluster scored the lowest. For self-rumination, the Ruminative Moratorium and Diffused Diffusion clusters scored the highest and the Achievement, Carefree Diffusion, and Foreclosure clusters scored the lowest. These results are consistent with the expected relationships between the identity clusters and these measures. Particularly relevant for this study is that the Achievement and Foreclosure clusters, which are both high in Commitment Making and Identification with Commitment, scored high on self-esteem and low on anxiety and depression. In my university sample I obtained Cronbach's alphas of .86 for Commitment Making and .89 for Identification with Commitment.

Goal orientation

Goal orientation was measured using two of the three Personal Achievement Goal Orientations subscales from the Patterns of Adaptive Learning Scales (PALS; Midgley et al., 2000). These two subscales are Mastery Goal Orientation and Performance-Avoid Goal Orientation. Response options are measured on a 5-point Likert scale that ranged from 0 (*not at all true*) to 4 (*very true*). The Mastery Goal Orientation subscale contains six items including "I

like class work that I'll learn from even if I make a lot of mistakes” and “an important reason why I do my class work is because I like to learn new things.” The Performance-Avoid Goal Orientation subscale consists of six items including “it's very important to me that I don't look stupid in my class” and “an important reason I do my class work is so that I don't embarrass myself.”

Ross, Shannon, Salisbury-Glennon, and Guarino (2002) examined the reliability and validity of the scores of a college sample on the PALS. Participants were 184 undergraduate students in education classes at a southeastern university. The sample was 74% female with a mean age of 22. Cronbach's alphas for students' scores on Mastery Goal Orientation, and Performance-Avoid Goal Orientation were .78 and .84. A confirmatory factor analysis revealed that the items did load on a three-factor model as hypothesized. For my university sample I obtained Cronbach's alphas of .85 for Mastery Goal Orientation and .89 for Performance-Avoid Goal Orientation.

Perceived academic self-efficacy

Eight questions from the Self-Efficacy for Learning and Performance subscale of the Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich et al., 1991) were used to measure perceived academic self-efficacy in a specific classroom. For this study, this subscale was modified to reflect perceived academic self-efficacy for all college courses. This subscale measures expectancy for success and perceived self-efficacy. Responses options for the subscale range from 0 (*not at all true of me*) to 7 (*very true of me*). Sample items include “I believe I will receive excellent grades in my courses,” and “I'm certain I can master the skills being taught in my classes.” With a sample of 380 Midwestern college and community college students, Pintrich et al. obtained a Cronbach alpha of .93. With regard to predictive validity, the students' scores on the scale were significantly correlated with final course grades ($r = .41$). Pintrich et al. also

conducted a confirmatory factor analysis and found that all eight items loaded on a factor they named Self-Efficacy for Learning and Performance. Recently, Cordell-McNulty and Ashton (2006) obtained a Cronbach alpha of .92 for the scores of 364 students on this scale at a college in the Northeast, and Cordell-McNulty and Ashton (2008) obtained a Cronbach alpha of .94 for the scores of 172 students at a community college in the Southeast. In this study I obtained a Cronbach's alpha of .93 for the university sample.

Parental involvement

Parental involvement was measured by the Academic Support subscale of the Parental Support for College measure (Mounts, 2004). This 40-item scale measures three types of parental support: academic, financial, and social support. Items response options on a 4-point Likert scale range from 0 (*strongly disagree*) to 3 (*strongly agree*). The Academic Support subscale consists of 12 items. Sample items for academic support include "My parents/guardian asked me about my class work (homework, exams, grades, and classes)," and "My parents/guardian gave encouragement when classes were tough." Mounts reported internal consistency data for two diverse samples of college freshmen. The first sample consisted of 183 students, 52% male, 56% White, 23% African-American, 13% Asian, 6% Latino, and 2% Multiracial. The second sample was composed of 400 students, 62% female, 58% White, 22% African-American, 7% Latino, 6% Asian, 5% Multiracial, and 2% other. For students' scores on the Academic Support subscale, a Cronbach alpha of .84 was obtained in the first sample, and a Cronbach alpha of .79 was obtained in the second sample.

As evidence of convergent validity for the Academic Support subscale, Mounts (2008) reported significant positive correlations of .47 between academic support and maternal acceptance and of .27 between academic support and parental acceptance. Parental acceptance was measured using the Child's Report of Parenting Behavior Inventory (CRPBI). As evidence

of discriminant validity for the Academic Support subscale, Mounts reported negative correlations of $-.18$ with the Beck Depression Inventory (BDI), and $-.08$ with the Beck Anxiety Inventory (BAI). These results provide evidence of the convergent and discriminant validity of the participants' scores on the academic support subscale because it was positively correlated with parental and maternal acceptance and negatively correlated with depression and anxiety. For the university sample in this study I obtained a Cronbach alpha of $.83$.

Parental autonomy support

Parental autonomy support was measured by the Parental Autonomy Support Scale (Duchesne et al., 2007; Ratelle et al., 2005). This measure is designed to assess college students' perceptions of their parents supporting their autonomy in their decision to pursue college studies. This 8-item scale was adapted from Paulson et al. (1994) and Robinson et al. (1995). Item response options are scored on a 5-point Likert scale ranging from 0 (*totally disagree*) to 4 (*totally agree*). Sample items include "my parents gave me a lot of freedom with respect to my choice of college program," and "my parents let me express myself during the decision process of choosing a college program." For the scores of 262 Canadian college students, Ratelle et al. obtained a Cronbach alpha of $.88$. For the scores of 498 Canadian college students (279 females, and 219 males) Duchesne et al. obtained a Cronbach alpha of $.87$. I obtained a Cronbach alpha of $.89$ for the university sample in this study.

Relatedness

Students' sense of relatedness to their parents, off-campus friends, instructors, and on-campus friends was measured by 16 items from a scale developed by Furrer and Skinner (2003). These items measured relatedness to four social partners: parents, instructors, classmates, and friends. The stem for each item is "When I'm with . . ." The four items for each stem are "I feel accepted," "I feel like someone special," "I feel ignored," and "I feel unimportant." Response

options ranged from 0 (*strongly disagree*) to 6 (*strongly agree*). Cordell-McNulty and Ashton (2008) used this measure in a sample of 146 community college students and obtained a Cronbach alpha of .82 for participants' scores. Cronbach alphas for the scores on the subscales were .88 for relatedness to parent, .82 for relatedness to instructors, .81 for relatedness to friends, and .84 for relatedness to classmates. For the university sample in this study I obtained Cronbach alphas of .88 for relatedness to parent, .86 for relatedness to instructor, .88 for relatedness to on-campus friends, and .87 for relatedness to off-campus friends.

Sense of belonging on campus

Students' sense of belonging on campus was measured by the Sense of Belonging subscale of the Perceived Cohesion Scale (PCS; Bollen & Hoyle, 1990). The three items of this measure are "I see myself as a part of the campus community," "I feel a sense of belonging to the campus community," and "I feel that I am a member of the campus community." Response options on this subscale range on an 11-point Likert scale from 0 (*strongly disagree*) to 10 (*strongly agree*). Bollen and Hoyle conducted a factor analysis of the responses of 102 undergraduates at a private liberal arts college and found that all three items loaded on one latent variable they identified as Sense of Belonging. In a study of 272 Latino undergraduates, Hurtado and Carter (1997) obtained a Cronbach alpha of .94 for the participants' scores on the 11 items, and a factor analysis indicated that all three items loaded on the Sense of Belonging factor. Mounts (2004) administered the sense of belonging subscale to 319 freshmen students and obtained a Cronbach alpha of .89 for African American students and a Cronbach alpha of .91 for White students. I obtained a Cronbach alpha of .96 for the university sample in this study.

Theory of intelligence

Participants' theory of intelligence was measured using the Theory of Intelligence Scale (Dweck, Chiu, & Hong, 1995). This 3-item instrument measures implicit beliefs about

intelligence with response options on a 6-point Likert scale ranging from 0 (*strongly agree*) to 5 (*strongly disagree*). The items are “you have a certain amount of intelligence, and you can’t really do much to change it,” “your intelligence is something about you that you can’t change very much,” and “you can learn new things, but you can’t really change your basic intelligence.” Participants’ scores are averaged with a higher score indicating an incremental belief. Dweck et al. (1995) reported internal reliabilities ranging from .94 to .98 across six studies for the Theory of Intelligence Scale. They also reported a 2-week test-retest reliability coefficient of .80. Factor analyses were conducted for five different data sets, and the three items loaded consistently on one factor. For the university sample in this study I obtained a Cronbach alpha of .93.

Personality

Personality was measured by the Conscientiousness subscale of the Big Five Inventory (BFI; John et al., 1991). The BFI is a 54-item instrument that measures the five personality dimensions, extraversion, openness, conscientiousness, agreeableness, and neuroticism. Items are rated on a 5-point Likert scale from 0 (*disagree strongly*) to 4 (*agree strongly*). There are nine items for the Conscientiousness subscale. Sample items for Conscientiousness include “does a thorough job” and “perseveres until the task is finished.” John and Srivastava (1999) surveyed a sample of 462 undergraduates at the University of California, Berkeley, and obtained a Cronbach’s alpha of .82 for students’ scores on the Conscientiousness subscale.

Providing support for convergent validity for the Conscientiousness subscale, John and Srivastava (1999) compared the BFI and two other personality measures, the Trait Descriptive Adjectives (TDA; Goldberg, 1992) and the NEO Five Factor Inventory (NEO-FFI; Costa & McCrae, 1992). The uncorrected pairwise convergent validity estimate for students’ scores on the Conscientiousness subscale of the BFI and the Conscientiousness subscale of the TDA was .81, and for scores on the Conscientiousness subscale of the BFI and the Conscientiousness

subscale of the NEO-FFI, .79. The corrected pairwise convergent validity estimate for scores on the Conscientiousness subscale of the BFI and the Conscientiousness subscale of the TDA was .94, and for the Conscientiousness subscale of the BFI and the Conscientiousness subscale of the NEO-FFI, .96. John and Srivastava (1999) also conducted a confirmatory factor analysis to test the convergent and discriminant of the BFI, the TDA, and the NEO-FFI. The CFA estimated the latent factors of the Big Five personality characteristics. The standardized validity coefficient obtained from the CFA for the Conscientiousness subscale of the BFI was .92. I obtained a Cronbach alpha of .82 for the university sample in this study.

Socioeconomic status

Socioeconomic status was determined using the Four Factor Index of Social Status (FFISS; Hollingshead, 1975). The FFISS is a multidimensional measure that takes into consideration the person's education, occupation, gender, and marital status to determine socioeconomic status. The FFISS consists of the sum of the two weighted factor scores, the education factor and the occupation factor. Education scores range from 1 (*less than seventh grade completed*) to 7 (*graduate professional training completed*). Occupation scores range from 1 (*e.g., farm laborers, low-level service workers*) to 9 (*e.g., higher executives, proprietors of large businesses, major professionals*). The FFISS is calculated by multiplying the occupation scale score by 5 and the education scale score by 3 and adding these scores together. If a person is married then the scores for each spouse are averaged together (Hollingshead, 1975).

As evidence of validity, Hollingshead (1975) reported a correlation of .93 between the occupation group scores of the FFISS and the National Opinion Research Center's occupational prestige scores. Hollingshead showed that the number of school years completed was positively correlated with occupation score on the FFISS for males ($r = .84, p < .001$) and females ($r = .85, p < .001$) using data from the 1970 census. In addition median earned income was positively

correlated with occupation scores on the FFISS for males ($r = .78, p < .001$) and females ($r = .67, p < .001$) using data from the 1970 census (Hollingshead, 1975).

Gottfried (1985) compared scores on the FFISS to the Revised Duncan (TSEI2) Socioeconomic Index and the Seigel 1965 NORC Prestige Scale using data from parents of 130 infants recruited from birth announcements. Gottfried reported a correlation of .79 between the FFISS and the Revised Duncan Socioeconomic Index and a correlation of .73 ($p < .001$) between the FFISS and the Seigel Prestige Scale.

Demographic information

For this study, students' gender, ethnicity, age, and extracurricular activities were obtained from their self-reports. Students were also asked to report SAT or ACT scores, and high school GPA and to give permission for validation of those scores from the registrar.

Outcome Variables

Social adjustment

Social adjustment was measured by the social adjustment subscale of the Student Adaptation to College Questionnaire (SACQ; Baker & Siryk, 1989). The SACQ is designed to assess student adjustment to college. The social adjustment subscale measures students' success in coping with the interpersonal-societal demands in the college experience. This 20-item subscale is measured on a 9-point Likert scale ranging from 0 (*applies very closely to me*) to 8 (*doesn't apply to me at all*). The social adjustment subscale can be divided into four clusters: general, other people, nostalgia, and social environment. The general cluster measures the extent and success of social functioning in general. The other people cluster measures involvement and relationships with people on campus. The nostalgia cluster measures dealing with being away from home and the social environment cluster measures satisfaction with the social environment (Baker & Siryk, 1989).

The SACQ Manual reports 14 studies at two colleges where the SACQ was administered to first- and second-semester freshmen. Alpha coefficients for students' scores on the social adjustment subscale ranged from .83 to .91. The manual also includes 11 other university data sets. The alpha coefficients for students' scores on the social adjustment subscale range from .73 to .91. For criterion-related validity, a social activities checklist that included items about campus involvement, attendance of campus events, and use of recreational facilities was used. There was a significant relationship between the social activities checklist and the social adjustment subscale, but not any of the other subscales (Baker & Siryk, 1989). Wick and Shilkret (1986) reported a significant relationship between the amount of extracurricular activity and the social adjustment subscale ($r = .47, p < .01$). Savino, Reuter-Krohn, and Costar (1986) found significant negative correlations between the number of visits the student made home and the social adjustment subscale. The significant correlations between social adjustment and participation in social and extracurricular activities and the number of visits the student made home provide evidence of the criterion-related validity of participants' scores on the SACQ..

With regard to construct validity, Caro (1985) reported significant negative correlations between the social adjustment subscale and emotional reliance on other persons ($r = -.23, p < .01$), lack of social self-confidence ($r = -.43, p < .01$), Social Avoidance and Distress Scale ($r = -.52, p < .01$), and the Revised UCLA Loneliness Scale ($r = -.66, p < .01$). Harris (1988) also reported a significant negative correlation between the Revised UCLA Loneliness Scale and the social adjustment subscale ($r = -.79, p < .01$). Saracoglu (1987) reported significant positive correlations between the social adjustment subscale and the Self-Esteem Inventory ($r = .63, p < .01$), the Self-Efficacy Scale ($r = .37, p < .05$), and social self-efficacy ($r = .58, p < .01$).

Flescher (1986) found a significant positive correlation between the social adjustment subscale and the full Mental Health Inventory ($r = .45, p < .01$), the positive affect subscale ($r = .40, p < .01$), and the psychological well-being subscale ($r = .30, p < .05$). There were also significant negative correlations between social adjustment and the anxiety subscale ($r = -.38, p < .05$), the depression subscale ($r = -.36, p < .05$), and the psychological distress subscale ($r = -.50, p < .01$). The significant positive correlations between positive mental health constructs and negative correlations between negative mental health constructs provide evidence of the construct validity of the participants' scores on the social adjustment subscale.

In another example of the construct validity of the social adjustment subscale, Caro (1985) reported a significant positive correlation between social adjustment and perceived social support from friends ($r = .36, p < .01$). Hogan (1986) also reported a significant positive correlation ($r = .31, p < .01$). Savino et al. (1986) found significant positive correlations between social adjustment and social support (total scale) during Semester 1 ($r = .30, p < .01$) and Semester 2 ($r = .40, p < .01$). The significant correlations between social support measures and social adjustment support the construct validity of participants' scores on the social adjustment subscale.

Baker and Siryk (1989) also reported correlations between the SACQ subscales and attrition after 1 year at Clark University. For six of the eight data sets there was a significant negative correlation between the social adjustment subscale and first-year attrition, suggesting the importance of social adjustment to college retention. Overall the psychometric data on the social adjustment subscale of the SACQ support its use in the study of college retention. For the university sample in this study I obtained a Cronbach alpha of .90.

Academic achievement

Students were asked to report their overall GPA and were also asked for their permission to obtain their GPA from the registrar. Only 120 students gave permission to have their GPAs obtained from the registrar. Because this number was insufficient to test the proposed model, students' self-reports of their GPA were used as the measure of academic achievement. In a meta-analysis of self-reported grades, class ranks, and test scores, From a meta-analysis of 12 studies of the validity of self-reported GPA in 12,089 college students, Kuncel, Credé, and Thomas (2005) found that the accuracy of self-reported GPAs was sufficiently high ($r = .90$) to warrant use in educational research.

Intention to persist

Intention to persist was measured using a single item adapted from Hausmann et al. (2007), "How confident are you that you will complete your intended degree at your current institution?" Students responded on a 7-point Likert scale ranging from 1 (*not at all confident*) to 7 (*very confident*). Cabrera, Nora, and Castaneda (1993) tested a structural equation model of college retention with 2,459 freshmen at a large southern university where persistence was measured by students re-enrolling the next fall and found that intention to persist had the strongest direct effect on actual persistence (.49).

Analyses

I used structural equation modeling to estimate the relationships in my model. The model contained eight endogenous variables, perceived academic self-efficacy, mastery goals, performance-avoid goals, commitment making, identification with commitment, academic achievement, social adjustment, and intention to persist. The model contained 10 exogenous variables, parental involvement, parent relatedness, parental autonomy support, off-campus

friend relatedness, instructor relatedness, on-campus friend relatedness, sense of belonging, extracurricular activities, conscientiousness, and entity beliefs.

CHAPTER 3 RESULTS

The purpose of this study was to test a new model of college retention that focused on the relationships among the family, peer, and college microsystems, the self-system, the psychological processes of identity, goal orientations, and perceived academic self-efficacy, and the outcome variables, academic achievement, social adjustment, and intention to persist. In this chapter the demographic characteristics of the sample, descriptive statistics, analysis of the hypothesized model, revisions to the model, and the results of testing the research hypotheses are described.

Descriptive Statistics

The university sample consisted of 299 participants. The sample was predominantly female (81%) and Caucasian (66%). Demographic data are presented in Table 3-1. The age range for this sample was 18-45. For data analysis I only included participants up to 26 years of age because 26 is considered the last year of emerging adulthood according to Arnett (2000, 2006). The mean SES score on the FFISS was 31.61, indicating a predominantly middle-class sample. Means and standard deviations for all the variables are reported in Table 3-2. The mean self-reported college GPA was 3.33. The correlation matrix is presented in Table 3-3.

Analysis of the Proposed Model

The hypothesized model was estimated using MPlus. Because the sample was predominantly female, the data were weighted by gender according to the national college enrollment by gender in 2005. In the fall of 2005, 43% of all enrolled students were male and 57% were female (National Center for Education Statistics, 2008). Gender was weighted .43 for males and .57 for females. To control for causes that were left out of the model, high school GPA, gender, and ethnicity were included as predictors for every endogenous variable. SAT

scores were not used as a control variable in the test of the original or the revised model because scores ranged from 830 to 2140, indicating that some students were reporting more than the total of their verbal and quantitative scores. Consequently, it was impossible to determine which scores students were reporting. Instead of the SAT, high-school GPA was used as the control for prior ability. Preliminary analyses of the SES data and student comments about the measure suggested that students may not have reported accurate information on which to base their SES, so SES was dropped from further analyses. Because there were too few participants to include each ethnicity separately in the analyses, students were split into two groups as follows: (a) Caucasian and Asian students, and (b) African American, Hispanic, Native American, and students who classified themselves as other. The goodness of fit test result was $\chi^2(36) = 159.22$, $p = .00$, indicating that the model did not fit the data. Other goodness of fit indices included the comparative fit index (CFI) = .38, the Tucker-Lewis index (TLI) = -.08, and the root mean square error of approximation (RMSEA) = .21. All of these indices indicated poor fit.

An analysis of the modification indices showed that some of the relationships could be improved. The largest modification index was between Commitment Making and Identification with Commitment (68.04). I allowed these errors to correlate. I ran the analysis again and the model still had poor fit, $\chi^2(34) = 91.73$, $p = .00$, CFI = .71, TLI = .46, RMSEA = .09. The largest modification index was 34.27 between perceived self-efficacy and Identification with Commitment. I added a path from Identification with Commitment to perceived self-efficacy, but the model still had poor fit, $\chi^2(34) = 58.68$, $p = .005$, CFI = .88, TLI = .77, RMSEA = .06. The largest modification index was 11.05 between perceived self-efficacy and conscientiousness so I added a path from conscientiousness to perceived self-efficacy. This time the model fit was better, but still not very good. The goodness of fit test result was $\chi^2(33) = 47.34$, $p = .05$, CFI =

.92, TLI = .86, RMSEA = .04. The largest modification index was 4.93 between perceived self-efficacy and performance-avoid goals, so I added a path from self-efficacy to performance-avoid goals. The model was run again and the goodness of fit indices were $\chi^2(33) = 44.07, p = .09$, CFI = .95, TLI = .89, RMSEA = .04, indicating a good fit. See Table 3-4 for a list of the total, direct, and indirect effects in the revised model.

Research Hypotheses

The following research hypotheses were tested, with high-school GPA, gender, and ethnicity controlled. These variables are not mentioned in the statement of each hypothesis. However, when the effects of those variables were significant, they are included in the description of the effects for the hypothesis.

Hypothesis 1 was, academic achievement, social adjustment, perceived academic self-efficacy, commitment making, identification with commitment, parental autonomy support, instructor relatedness, on-campus friend relatedness, sense of belonging, extracurricular activities, and entity beliefs predict intention to persist. The only significant direct path to intention to persist was from perceived self-efficacy ($\beta = .29, p = .000$). However, conscientiousness has an indirect relationship to intention to persist through perceived self-efficacy ($\gamma = .08, p = .001$) and through identification with commitment and perceived self-efficacy ($\gamma = .02, p = .005$). A significant indirect effect to sense of belonging was mediated through identification with commitment and self-efficacy ($\gamma = .01, p = .01$), and a significant indirect effect of identification with commitment on intentions to persist was mediated through self-efficacy ($\beta = .05, p = .000$).

Hypothesis 2 was perceived academic self-efficacy, commitment making, identification with commitment, mastery goals, performance-avoid goals, parental involvement, parental autonomy support, instructor relatedness, extracurricular activities, entity beliefs, and

conscientiousness predict academic achievement. Results indicated significant direct paths to academic achievement from entity beliefs ($\gamma = .14, p = .04$), performance-avoid goals ($\beta = -.20, p = .0005$), self-efficacy ($\beta = .17, p = .005$), and ethnicity group ($\gamma = .37, p = .002$). In addition significant indirect effects of entity beliefs on achievement were mediated through performance-avoid goals ($\gamma = -.04, p = .02$) and from self-efficacy that were mediated through performance-avoid goals ($\beta = .03, p = .02$). Four significant indirect effects on academic achievement were also found: from conscientiousness mediated through perceived self-efficacy ($\gamma = .05, p = .02$), from conscientiousness mediated through identification with commitment and perceived self-efficacy ($\gamma = .009, p = .02$), from conscientiousness mediated through perceived self-efficacy and performance-avoid goals ($\gamma = .008, p = .04$), and from conscientiousness mediated through identification with commitment, perceived self-efficacy, and performance-avoid goals ($\gamma = .002, p = .04$). In addition there were two significant indirect effects on academic achievement from identification with commitment. One was mediated through perceived self-efficacy ($\beta = .03, p = .008$) and the other was mediated through perceived self-efficacy and performance-avoid goals ($\beta = .005, p = .02$).

Hypothesis 3 was perceived academic self-efficacy, commitment making, identification with commitment, mastery goals, performance-avoid goals, parental autonomy support, off-campus friend relatedness, instructor relatedness, on-campus friend relatedness, extracurricular activities, and sense of belonging predict social adjustment. There were several significant direct paths to social adjustment including from parental autonomy support ($\gamma = .23, p = .005$), on-campus friend relatedness ($\gamma = .14, p = .01$), sense of belonging ($\gamma = .34, p = .001$), extracurricular activities ($\gamma = .21, p = .001$), performance-avoid goals ($\beta = -.17, p = .0005$), and self-efficacy ($\beta = .13, p = .003$). There were also significant paths from gender ($\gamma = .11, p = .03$)

and high school GPA ($\gamma = .14, p = .02$). Academic self-efficacy also had a significant indirect effect on social adjustment that was mediated through performance-avoid goals ($\beta = .02, p = .02$). In addition, there were two significant indirect effect of identification with commitment. One was mediated through perceived self-efficacy ($\beta = .02, p = .006$) and the other was mediated through perceived self-efficacy and performance-avoid goals ($\beta = .004, p = .02$).

Hypothesis 4 was perceived academic self-efficacy, parent relatedness, sense of belonging, and entity beliefs predict mastery goals. There were significant paths from entity beliefs ($\gamma = -.17, p = .006$) and perceived self-efficacy ($\beta = .15, p = .0005$). There was also a significant path from gender ($\gamma = .16, p = .004$). In addition there was an indirect effect of sense of belonging that was mediated through identification with commitment and perceived academic self-efficacy ($\gamma = .006, p = .013$).

Hypothesis 5 was perceived academic self-efficacy, sense of belonging, and entity beliefs predict performance-avoid goals. There were significant paths from entity beliefs ($\gamma = .18, p = .006$) and perceived self-efficacy ($\beta = -.14, p = .007$). There was also a significant direct effect from gender ($\gamma = -.13, p = .03$). In addition, there was a significant indirect effect from sense of belonging that was mediated through identification with commitment and perceived academic self-efficacy ($\gamma = -.006, p = .027$).

Hypothesis 6 was parental involvement, instructor relatedness, and sense of belonging predict perceived academic self-efficacy. There were significant paths from instructor relatedness ($\gamma = .14, p = .05$), conscientiousness ($\gamma = .29, p = .000$), and identification with commitment ($\beta = .19, p = .000$). There was also a significant path from ethnicity group ($\gamma = .11, p = .05$). In addition a significant indirect effect of sense of belonging was found that was mediated through identification with commitment ($\gamma = .04, p = .004$). There was also an indirect

effect of conscientiousness that was mediated through identification with commitment ($\gamma = .06, p = .0005$).

Hypothesis 7 was parental autonomy support, parent relatedness, sense of belonging, and conscientiousness predict commitment making. Significant paths were from parental autonomy support ($\gamma = .15, p = .02$), sense of belonging ($\gamma = .14, p = .04$) and conscientiousness ($\gamma = .29, p = .000$).

Hypothesis 8 was parental autonomy support, sense of belonging, and conscientiousness predict identification with commitment. Significant paths were from sense of belonging ($\gamma = .23, p = .001$) and conscientiousness ($\gamma = .31, p = .000$).

Table 3-1 Demographic data

Measure	%	N
Gender		
Male	19%	58
Female	81%	240
Ethnicity		
Caucasian	66%	196
African American	16%	49
Hispanic	9%	27
Asian	3%	9
Native American	0.3%	1
Other	5%	16
Class		
Freshmen	19%	58
Sophomore	17%	52
Junior	31%	93
Senior	28%	84
Other	4%	12

Table 3-2 Means and standard deviations of variables

Variable	<i>N</i>	<i>M</i>	<i>SD</i>	Min	Max
Commitment making	298	2.93	0.74	0.00	4.00
Identification with commitment	297	2.86	0.77	0.00	4.00
Academic self-efficacy	296	4.66	0.91	0.25	6.00
Mastery goals	297	2.52	0.71	0.33	4.00
Performance-Avoid goals	293	1.80	0.94	0.00	4.00
Parental involvement	289	1.59	0.56	0.00	2.75
Parental relatedness	296	5.34	0.98	1.00	6.00
Instructor relatedness	299	3.58	1.24	0.25	6.00
On-Campus friend relatedness	298	4.63	1.14	0.75	6.00
Off-Campus friend relatedness	297	5.18	1.02	0.50	6.00
Parental autonomy support	294	3.40	0.74	0.00	4.00
Sense of belonging	297	1.96	0.74	0.00	3.00
Conscientiousness	295	25.29	5.94	10.00	36.00
Entity beliefs	296	2.13	1.29	0.00	5.00
Extracurricular activities	285	2.10	1.83	0.00	10.00
Social adjustment	298	5.60	1.34	1.06	8.00
College GPA	251	3.33	0.45	1.58	4.00
Intention to persist	297	5.51	0.94	0.00	6.00
High school GPA	276	3.99	0.64	1.65	6.70
SAT total score	192	1223.86	174.26	830.00	2140.00
ACT total score	144	25.66	3.89	14.00	38.00
SES	249	31.61	7.70	11.00	55.00
Age	298	20.87	2.97	18.00	45.00

Table 3-3 Correlation matrix

	CM	IC	MG	P-AG	SE	PI	PR	PA	OFR	IR	OCR	SB
CM	1.00											
IC	****.79	1.00										
MG	***.24	***.26	1.00									
P-AG	-.12	-.09	-.09	1.00								
SE	*.17	***.23	****.33	*-.17	1.00							
PI	-.02	.04	.05	.10	-.06	1.00						
PR	.03	.09	.09	-.02	-.01	***.44	1.00					
PA	** .21	*.17	*.18	*-.18	.04	-.07	***.26	1.00				
OFR	** .21	****.29	** .21	-.03	.08	*.18	***.27	.12	1.00			
IR	-.01	.07	** .21	.04	** .23	** .24	.13	.00	** .22	1.00		
OCR	.01	.14	.13	-.07	.12	***.24	****.30	.05	****.44	***.24	1.00	
SB	.13	** .22	.13	-.03	.06	*.15	** .21	.12	.09	.13	****.29	1.00
EX	.04	.06	.01	-.00	.01	.04	.06	-.06	-.05	-.08	.04	****.32
CO	** .23	****.31	***.26	-.20	****.29	.07	*.18	** .20	** .20	** .20	** .19	** .23
EN	-.12	-.03	**-.20	** .21	*-.14	-.00	-.00	-.11	-.11	-.00	.04	.05
HSGPA	.03	.06	*-.15	.11	-.02	.10	.01	-.04	-.04	-.07	.08	.02
Gender	.05	.03	** .21	-.11	.08	-.05	-.05	.03	.00	*.15	.03	-.12
Group	-.01	-.05	-.01	.06	.08	.06	.03	.12	** .22	*.16	.09	-.10
SA	*.14	*.17	*.15	**-.23	*.18	.12	***.25	****.29	** .22	.12	****.35	****.53
GPA	.10	.14	-.04	*-.17	** .21	.02	.06	.07	.10	.07	-.01	.11
INPS	.04	-.01	.13	.01	****.27	.08	*.16	-.04	-.05	.03	-.03	.00

Note. CM = commitment making; IC = identification with commitment; MG = mastery goals; P-AG = performance-avoid goals; SE = academic self-efficacy; PI = parental involvement; PR = parent relatedness; PA = parental autonomy support; OFR = off-campus friend relatedness; IR = instructor relatedness; OCR = on-campus friend relatedness; SB = sense of belonging; EX = extracurricular activities; CO = conscientiousness; EN = entity beliefs; HSGPA = high school GPA; Group = ethnicity group; SA = social adjustment; INPS = intention to persist.

* $p < .05$. ** $p < .01$. *** $p < .001$. **** $p < .0001$.

Table 3-3 Continued

	EX	CO	EN	HSGPA	Gender	Group	SA	GPA	INPS
EX	1.00								
CO	*.15	1.00							
EN	.01	-.13	1.00						
HSGPA	.09	.05	*.14	1.00					
Gender	*-.14	***-.24	-.04	*-.16	1.00				
Group	-.10	-.06	.06	.00	-.01	1.00			
SA	****.33	***.27	-.05	.10	.03	-.02	1.00		
GPA	*.15	*.14	.11	.09	-.06	****.31	*.18	1.00	
INPS	.04	.07	-.08	-.01	.05	-.11	*.14	*.14	1.00

Note. EX = extracurricular activities; CO = conscientiousness; EN = entity beliefs; HSGPA = high school GPA; Group = ethnicity group; SA = social adjustment; INPS = intention to persist.
 $*p < .05$. $**p < .01$. $***p < .001$. $****p < .0001$.

Table 3-4 Total, direct, and indirect effects in the revised model

Variable	Effect	CM	IC	MG	P-AG	SE	SA	GPA	INPS
Group	Total	-.02	-.08	-.10	.01	.10	.04	****.32	-.09
	Direct	-.02	-.08	-.11	.02	*.11	.07	***.37	-.09
	Indirect	--	--	.01	-.01	-.01	-.03	-.05	.00
Gender	Total	.07	.07	** .17	*-.14	.04	** .13	.03	.02
	Direct	.07	.07	** .16	*-.13	.03	*.11	.01	-.01
	Indirect	--	--	.01	-.01	.01	.02	.02	.03
HSGPA	Total	.05	.04	-.02	.00	.04	** .13	.08	.03
	Direct	.05	.04	-.03	.01	.03	*.14	.09	.01
	Indirect	--	--	.01	-.01	.01	-.01	-.01	.02
PI	Total	--	--	-.01	.01	-.04	-.01	-.05	-.02
	Direct	--	--	--	--	-.04	--	-.04	--
	Indirect	--	--	-.01	.01	--	-.01	-.01	-.02
PR	Total	-.09	--	.02	--	--	.07	.10	.13
	Direct	-.09	--	.02	--	--	--	--	--
	Indirect	--	--	--	--	--	.07	.10	.13
PA	Total	*.15	.09	--	--	.02	** .17	-.04	-.09
	Direct	*.15	.09	--	--	--	** .23	.03	-.04
	Indirect	--	--	--	--	.02	-.06	-.07	-.05
OFR	Total	--	--	--	--	--	--	--	.01
	Direct	--	--	--	--	--	.10	--	--
	Indirect	--	--	--	--	--	--	--	.01
IR	Total	--	--	.02	-.02	*.14	.02	.02	.05
	Direct	--	--	--	--	*.14	.00	-.01	--
	Indirect	--	--	.02	-.02	--	.02	.03	.05
OCR	Total	--	--	--	--	--	** .14	--	-.15
	Direct	--	--	--	--	--	** .14	--	-.17
	Indirect	--	--	--	--	--	--	--	.02
SB	Total	*.14	***.23	.07	-.01	-.01	****.39	.10	-.03
	Direct	*.14	***.23	.07	-.01	-.05	***.34	--	-.19
	Indirect	--	--	-.00	.00	***.04	.05	.10	.16

Note. CM = commitment making; IC = identification with commitment; MG = mastery goals; P-AG = performance-avoid goals; SE = academic self-efficacy; PI = parental involvement; PR = parent relatedness; PA = parental autonomy support; OFR = off-campus friend relatedness; IR = instructor relatedness; OCR = on-campus friend relatedness; SB = sense of belonging; EX = extracurricular activities; CO = conscientiousness; EN = entity beliefs; HSGPA = high school GPA; Group = ethnicity group; SA = social adjustment; INPS = intention to persist.

* $p < .05$. ** $p < .01$. *** $p < .001$. **** $p < .0001$.

Table 3-4 Continued

Variable	Effect	CM	IC	MG	P-AG	SE	SA	GPA	INPS
EX	Total	--	--	--	--	--	***.21	.13	.01
	Direct	--	--	--	--	--	***.21	.13	-.03
	Indirect	--	--	--	--	--	--	--	.04
CO	Total	****.29	****.31	** .05	*-.05	****.35	.05	*.15	*.14
	Direct	****.29	****.31	--	--	****.29	--	.05	--
	Indirect	--	--	** .05	*-.05	***.06	.05	.10	*.14
EN	Total	--	--	**-.17	** .18	--	-.02	.12	.00
	Direct	--	--	**-.17	** .18	--	--	*.14	-.01
	Indirect	--	--	--	--	--	-.02	-.02	.01
CM	Total	--	--	--	--	--	-.82	-1.1	-1.16
	Direct	--	--	--	--	--	-.82	-1.1	-1.16
	Indirect	--	--	--	--	--	--	--	--
IC	Total	--	--	** .03	**-.03	****.19	.80	1.18	1.45
	Direct	--	--	--	--	****.19	.77	1.15	1.16
	Indirect	--	--	** .03	**-.03	--	** .03	** .03	.29
MG	Total	--	--	--	--	--	-.05	-.08	--
	Direct	--	--	--	--	--	-.05	-.08	--
	Indirect	--	--	--	--	--	--	--	--
AG	Total	--	--	--	--	--	***-.17	***-.20	--
	Direct	--	--	--	--	--	***-.17	***-.20	--
	Indirect	--	--	--	--	--	--	--	--
SE	Total	--	--	***.15	**-.14	--	***.15	** .19	****.33
	Direct	--	--	***.15	**-.14	--	** .13	** .17	****.29
	Indirect	--	--	--	--	--	.02	.02	.04
SA	Total	--	--	--	--	--	--	--	.14
	Direct	--	--	--	--	--	--	--	.14
	Indirect	--	--	--	--	--	--	--	--
GPA	Total	--	--	--	--	--	--	--	.10
	Direct	--	--	--	--	--	--	--	.10
	Indirect	--	--	--	--	--	--	--	--

Note. CM = commitment making; IC = identification with commitment; MG = mastery goals; AG = performance-avoid goals; SE = academic self-efficacy; PI = parental involvement; PR = parent relatedness; PA = parental autonomy support; OFR = off-campus friend relatedness; IR = instructor relatedness; OCR = on-campus friend relatedness; SB = sense of belonging; EX = extracurricular activities; CO = conscientiousness; EN = entity beliefs; HSGPA = high school GPA; Group = ethnicity group; SA = social adjustment; INPS = intention to persist.

* $p < .05$. ** $p < .01$. *** $p < .001$. **** $p < .0001$.

Table 3-5 Effects proposed in original model and effects in revised model

Variable	CM	IC	MG	AG	SE	GPA	SA	INPS
PI					-	-		
PR	-		-					
PA	*	-				-	*	-
OFR							-	
IR					*	-	-	
OCR							*	-
SB	*	*	-	-	-		*	-
EX						-	*	-
CO	*	*			+	-		
EN			*	*		*		-
CM						-	-	-
IC					+	-	-	-
MG						-	-	
AG						*	*	
SE			*	+		*	*	*
GPA								-
SA								-

Note: CM = commitment making; IC = identification with commitment; MG = mastery goals; AG = performance-avoid goals; SE = academic self-efficacy; PI = parental involvement; PR = parent relatedness; PA = parental autonomy support; OFR = off-campus friend relatedness; IR = instructor relatedness; OCR = on-campus friend relatedness; SB = sense of belonging; EX = extracurricular activities; CO = conscientiousness; EN = entity beliefs; HSGPA = high school GPA; Group = ethnicity group; SA = social adjustment; INPS = intentions to persist.

* = hypothesized relationship that was significant in revised model.

- = hypothesized relationship that was not significant in revised model.

+ = significant relationship that was not proposed in the original model.

CHAPTER 4 DISCUSSION

The purpose of this study was to test a model of college success and retention based on a bioecological perspective (Bronfenbrenner & Morris, 1998). This new bioecological systems model of college retention focused on the ecological systems of family, peer, college, and the self that predict college success and the psychological processes (identity, perceived academic self-efficacy, and achievement goals) that mediate the relationship between the ecological systems and college success. This model addressed weaknesses in the research literature by combining the sociological and psychological perspectives that are commonly used in the college retention literature. A preliminary analysis indicated a poor fit of the model to the data. On the basis of the modification indices, I added three paths and one correlated error. In the next section I summarize the results for each of the microsystems. Finally, I identify weaknesses in the study and discuss directions for future research and implications for theory and practice.

The Bioecological Systems

The Family Microsystem

Within the family microsystem I hypothesized that parental involvement predicts perceived academic self-efficacy and GPA; relatedness to parents predicts commitment making and mastery goals, and parental autonomy support predicts commitment making, identification with commitment, GPA, social adjustment, and intention to persist. However, only the hypothesized effects of parental autonomy support on commitment making ($\gamma = .15, p = .02$) and social adjustment ($\gamma = .23, p = .005$) were confirmed. That finding that parental autonomy support is related to social adjustment supports the findings of Soenens et al. (2007). In addition, the finding that parental autonomy support is related to commitment making supports the findings of Luyckx, Goossens, et al. (2006), and Luyckx, Soenens, Vansteenkiste, et al. (2007). However,

parental autonomy support does not predict identification with commitment, as found in Luyckx, Goossens, et al. and Luyckx, Soenens, Vansteenkiste, et al. The participants in these two studies were Belgian college students, most of whom lived at home. Parental autonomy support might be more important to identity when students live with their parents as most of the students in my university sample do not live at home (87%). In sum, only the parental variable of autonomy support is related to other variables in the model, specifically identity and social adjustment, even if college students do not live at home.

The Peer Microsystem

I hypothesized that relatedness to off-campus friends predicts social adjustment. However, results indicate that relatedness to off-campus friends is not related to social adjustment. In contrast, relatedness to on-campus friends is a significant predictor of social adjustment, suggesting that on-campus friends may matter to social adjustment, but off-campus friends may not.

The College Microsystem

I hypothesized that the college microsystem variable of relatedness to instructors predicts perceived academic self-efficacy, GPA, and social adjustment; on-campus relatedness to friends predicts social adjustment and intention to persist; sense of belonging predicts commitment making, identification with commitment, mastery goals, performance-avoid goals, perceived academic self-efficacy, social adjustment, and intention to persist, and extracurricular activities predict GPA, social adjustment, and intention to persist. Results indicate that relatedness to instructors is only significantly related to perceived academic self-efficacy ($\gamma = .14, p = .05$). This result with university students is consistent with Cordell-McNulty and Ashton's (2008) result with community college students, suggesting that instructors may play a role in increasing the motivation of college students.

As noted in the previous section, relatedness to friends predicts social adjustment ($\gamma = .14$, $p = .01$) as expected. This result supports the findings of Buote et al. (2007) and Friedlander et al. (2007) that friends play a role in the social adjustment of college students.

Of all the variables in the college microsystem, sense of belonging has the largest number of significant relationships to other variables in the model. Sense of belonging is a significant predictor of commitment making ($\gamma = .14$, $p = .04$), identification with commitment ($\gamma = .23$, $p = .001$), and social adjustment ($\gamma = .34$, $p = .001$). That sense of belonging is directly related to the psychological process variables of commitment making and identification with commitment lends support to Rodgers and Summers's (2008) model, in which sense of belonging is hypothesized to predict psychological process variables. In addition, sense of belonging is indirectly related to the psychological process variables, mastery goals ($\gamma = .006$, $p = .013$), performance-avoid goals ($\gamma = -.006$, $p = .027$), and academic self-efficacy ($\gamma = .04$, $p = .004$) through identification with commitment. The finding that sense of belonging is directly related to social adjustment is consistent with the findings of Mounts (2004) and Ostrove and Long (2007). Sense of belonging is also related to intention to persist through identification with commitment and perceived academic self-efficacy ($\gamma = .01$, $p = .01$).

The number of students' extracurricular activities are positively associated with social adjustment ($\gamma = .21$, $p = .001$). This result is consistent with findings of Bohnert et al. (2007) who found a negative relationship between the number of hours a week students engaged in extracurricular activities and loneliness and a positive relationship between the number of hours students spent in extracurricular activities and the quality of their friendships. However, participation in extracurricular activities is not related to GPA or intention to persist in contrast to findings of Fischer (2007) and Cordell-McNulty and Ashton (2008) who reported significant

relationships between participation in extracurricular activities and GPA. It is notable that those two studies focused on students in the first 2 years of college, whereas most of the students in this study (59%) were in their last 2 years of college. Perhaps involvement in extracurricular activities in the later years of college is less important to achievement than it is in the first 2 years.

The Self-System

I hypothesized that (a) the self-system variable of conscientiousness predicts commitment making, identification with commitment, perceived self-efficacy, and GPA; (b) the self-system variable of entity beliefs predicts mastery and performance-avoid goals, and academic achievement, and (c) the self-system variable of academic achievement predicts academic achievement and intention to persist. Conscientiousness is directly related to the psychological process variables of commitment making ($\gamma = .29, p = .000$), identification with commitment ($\gamma = .31, p = .000$), and perceived academic self-efficacy ($\gamma = .29, p = .000$). The significant relationship between conscientiousness and commitment making and identification with commitment supports the findings of Luyckx, Soenens, and Goossens (2006). The finding that conscientiousness predicts perceived academic self-efficacy was not hypothesized in the original model but was added based on the modification indices. In addition, conscientiousness is indirectly related to GPA through four psychological process variables: perceived academic self-efficacy ($\gamma = .05, p = .02$), identification with commitment and perceived academic self-efficacy ($\gamma = .009, p = .02$), perceived academic self-efficacy and performance-avoid goals ($\gamma = .008, p = .04$), and identification with commitment, perceived academic self-efficacy, and performance-avoid goals ($\gamma = .002, p = .04$). These indirect relationships suggest paths through which conscientiousness affects GPA, and they lend support to the results of Nguyen et al. (2005) and Wolfe and Johnson (1995), who also found that conscientiousness is related to GPA.

Consistent with my hypotheses and the findings of Robins and Pals (2002), entity beliefs are positively related to performance-avoid goals ($\gamma = .18, p = .006$) and negatively related to mastery goals ($\gamma = -.17, p = .006$); however, contrary to expectation and the theoretical literature and previous research, entity beliefs (e.g., Aronson, 2000) are positively related to GPA ($\gamma = .14, p = .04$). In this study, the correlation between entity beliefs and high-school GPA is nonsignificant, suggesting that this relationship may not be a reliable finding. Entity beliefs are also indirectly related to GPA through performance-avoid goals ($\gamma = -.04, p = .02$). This indirect relationship of entity beliefs with GPA is in the hypothesized direction.

Previous achievement, as measured by high school GPA, is directly related to social adjustment ($\gamma = .14, p = .02$). However, high school GPA was not related to college GPA, as has been typically found in previous research (e.g., Elias & MacDonald, 2007; Fischer, 2007; Mattson, 2007; Robbins et al., 2004; Robbins et al., 2006). This finding could be related to the restriction in range in high school and college GPAs in this university sample.

The Macrosystem

Gender is significantly negatively related to performance-avoid goals, ($\gamma = -.13, p = .03$), and positively related to mastery goals ($\gamma = .16, p = .004$), and social adjustment ($\gamma = .11, p = .03$), with males less likely to have performance-avoid goals and more likely to have mastery goals, and to be socially adjusted.

Ethnicity predicts perceived academic self-efficacy ($\gamma = .11, p = .05$) and GPA ($\gamma = .37, p = .002$). Students classified as Caucasian and Asian report higher perceived academic self-efficacy and GPAs compared to students in other ethnic groups. The finding that ethnicity is related to college GPA is consistent with the results of Cordell-McNulty and Ashton (2008) and Robbins et al. (2006).

Psychological Process Variables

Identity

I hypothesized that commitment making and identification with commitment predict academic achievement, social adjustment, and intention to persist in college students; however none of these relationships are significant. Identification with commitment is significantly related to perceived academic self-efficacy ($\beta = .19, p = .000$), a path added to the original model based on the modification indices, and significantly related to social adjustment through perceived academic self-efficacy ($\beta = .02, p = .006$) and through perceived academic self-efficacy and performance-avoid goals ($\beta = .004, p = .02$). Like its relationship to social adjustment, identification with commitment has two significant relationships with GPA mediated through perceived academic self-efficacy ($\beta = .03, p = .008$) and through perceived academic self-efficacy and performance-avoid goals ($\beta = .005, p = .02$). For intention to persist, there is only one significant indirect relationship which is mediated through perceived academic self-efficacy ($\beta = .05, p = .000$). These results show that identification with commitment is related to all three of the outcome variables, but these relationships are completely mediated by academic self-efficacy and performance-avoid goals.

Achievement Goals

I hypothesized that mastery and performance-avoid goals predict academic achievement and social adjustment. However, results indicate only performance-avoid goals are related to academic achievement ($\beta = -.20, p = .0005$) and social adjustment ($\beta = -.17, p = .0005$). The finding that performance-avoid goals are negatively related to academic achievement replicates the findings of Hsieh et al. (2007). The finding that performance-avoid goals predict social adjustment supports the negative relationship hypothesized in the Bean and Eaton (2000) model. It is noteworthy that mastery goals are not positively related to social adjustment or GPA. The

research on the relationship between mastery goals and achievement is mixed, and most studies reporting positive relationships between mastery goals and achievement have not included a control for prior ability.

Perceived Academic Self-Efficacy

I hypothesized that perceived academic self-efficacy predicts mastery goals, performance avoid goals, academic achievement, social adjustment, and intention to persist. Results supported these hypotheses: Perceived academic self-efficacy is related to mastery goals ($\beta = .15, p = .0005$), academic achievement ($\beta = .17, p = .005$), social adjustment ($\beta = .13, p = .003$), and intention to persist ($\beta = .29, p = .000$). In addition, perceived academic self-efficacy is negatively related to performance-avoid goals ($\beta = -.14, p = .007$). This relationship was not included in the original model but was added on the basis of the modification indices. The finding that perceived academic self-efficacy predicts academic achievement supports the results of Bembenutty (2007), Elias and MacDonald (2007), Multon et al. (1991), and Robbins et al. (2004). The finding that perceived academic self-efficacy predicts intention to persist lends support to the findings of Robbins et al. In addition, the finding that perceived academic self-efficacy predicts social adjustment is consistent with research by DeWitz and Walsh (2002). That perceived academic self-efficacy predicts mastery goals is consistent with the finding of Hsieh et al. (2007). However, unlike this study, Hsieh et al. did not find a significant relationship between perceived academic self-efficacy and performance-avoid goals.

Outcome Variables

I hypothesized that social adjustment and academic achievement predict intention to persist; however, neither variable predicts intention to persist. This result may be due to a ceiling effect in the measure of intent to persist ($M = 5.51$ on a 6.00 scale).

Limitations of the Study

This study has several limitations that should be addressed in future studies: First, I did not measure actual persistence, only intention to persist. Although other researchers have found that intention to persist predicts persistence (e.g., Cabrera et al., 1993), measuring actual persistence would increase the ecological validity of the study. Second, GPAs, SAT, and ACT scores were based on students' self-reports. Although obtaining official GPAs and test scores to ensure their accuracy is desirable, many students refuse to give researchers permission to obtain their official test scores from the registrar. Strategies to overcome students' reluctance need to be explored. Third, because the relationships obtained in this study are correlational, conclusions regarding the direction of causality are speculative and require validation through experimental research.

Implications of the Findings for Future Research

Of particular note, perceived academic self-efficacy is the only variable in the model with a direct relationship to the three outcome variables: intention to persist, social adjustment, and GPA. In addition academic self-efficacy mediated many of the indirect effects in the model as well. These results are consistent with Bandura's (1997) conception of perceived self-efficacy and its importance for academic success. Bandura identified four sources of perceived self-efficacy: (a) mastery experience, (b) vicarious experiences, (c) verbal persuasion, and (d) physiological and affective states. Future research designed to increase students' retention in college should investigate strategies based on those four sources. In terms of predicting outcomes, performance-avoid goals is the second most influential variable, predicting students' social adjustment and GPA. This finding suggests a need to develop strategies to help students develop more positive achievement goals. It was surprising that mastery goals, commitment making, and identification with commitment are not significant predictors of any of the outcome variables. However, identification with commitment is indirectly related to all three of the

outcome variables. In sum, perceived academic self-efficacy and performance-avoid goals are the strongest predictors of the three college outcomes: intent to persist, GPA, and social adjustment.

Conclusions

The new bioecological model of college retention tested in this study provides researchers and higher education administrators with a structured way of identifying strategies from multiple sources with diverse relationships to students' GPA, social adjustment, and intention to persist that could be adopted simultaneously to improve the likelihood of increasing college retention. For example, with one exception (off-campus friends in the peer microsystem) significant relationships to at least one of the outcome variables were found in every microsystem of the students' lives. Of the parental variables examined in this study, parental autonomy support has a direct relationship with social adjustment. Research focusing on helping parents understand the benefits of providing autonomy support during freshman orientation or through parent newsletters may be helpful in increasing retention. With regard to the college microsystem, several approaches to increasing retention are suggested from this study. Students' relatedness to instructors has a direct relationship to students' perceived academic efficacy. Administrators could investigate whether providing instructors with strategies to help students feel accepted in their classrooms increases students' social adjustment, GPA, and intention to persist through its relationship with perceived academic self-efficacy. Participation in extracurricular activities has a significant relationship to social adjustment. Research is warranted to determine whether activities encouraging students to participate in extracurricular activities increases retention. Sense of belonging to the institution has the strongest direct relationship of all the variables in the study to social adjustment. Strategies to increase identity with the university should be tested as a potentially important way to influence students' social adjustment. In the self-system,

conscientiousness has the largest number of indirect relationships to GPA and intention to persist of any variable in the study. Strategies to increase students' conscientiousness may have effects on multiple psychological processes related to achievement and intent to persist, including mastery goals, performance-avoid goals, and perceived academic self-efficacy.

The results of this study emphasize the importance of the relationships between psychological process variables (in particular, perceived academic self-efficacy and performance-avoid goals) and the outcome variables of social adjustment, GPA, and intention to persist. These results suggest that researchers and higher education administrators might focus on developing interventions to increase academic self-efficacy and decrease performance-avoid goals as a means of increasing students' retention. One way to increase perceived self-efficacy that is suggested in the model tested in this study is to increase students' feelings of relatedness to their instructors. One way to decrease performance-avoid goals suggested by the model is to decrease entity beliefs and help students foster a more incremental view of intelligence. It is my hope that these findings will help advance research on the problems of college retention and ultimately lead to increasing the graduation rate of college students.

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BIOGRAPHICAL SKETCH

Kristi Cordell-McNulty was born and raised in south central Pennsylvania, just north of the Mason-Dixon line. She attended Shippensburg University and received a bachelor's degree in computer science. After completing an internship and deciding computer science was not the right career path, she received her master's degree in psychology from Shippensburg University. Kristi was then awarded a Fellowship to study for the Ph.D. in the University of Florida's educational and developmental psychology co-major Ph.D. program. After receiving her Ph.D., Kristi assumed the position of Assistant Professor at Angelo State University in San Angelo, TX.