USING A RISK PREDICTION MODEL WITH FIRST-YEAR COLLEGE STUDENTS: EARLY INTERVENTION TO SUPPORT ACADEMIC ACHIEVEMENT

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ABSTRACT

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Doctoral Advisory Committee Chair: Dr. Joseph DuCette

The purpose of the study was to investigate the establishment of an early warning system and subsequent intervention with college freshmen, which addressed both the academic viability and retention of first-year students. The population of interest was first-semester students who were predicted to succeed by standard admissions criteria, but fail to achieve minimum academic standards at the university level. The two main goals of the study were to: a) validate the use of a prediction model to establish a system of early identification of first-semester college students who are at-risk of academic difficulty, and b) examine the efficacy of an intervention designed to support these students. Using first-semester GPA as the outcome variable, a prediction equation was developed using multiple regression with historical data (both cognitive and non-cognitive variables) from a prior cohort of freshmen. The equation was applied to a new cohort of freshmen, who were assigned levels of academic risk. An advising-based intervention was utilized with the most academically at-risk students in the participating academic unit. The results of the study showed that the risk prediction equation was modestly correlated with first-semester GPA (r=.48, p<.001), while a step-wise multiple regression revealed that individual predictors were differentially effective among the risk levels. Comparisons of first-year

academic performance indicated that the intervention was not effective in remediating risk variables for the experimental group. While the risk prediction and categorization system showed promise, modifications could be made to further enhance effectiveness across the full continuum of risk levels, including the development of the equation with subgroups of interest as well as use of more sophisticated instrumentation to measure key non-cognitive variables. In order to establish an effective intervention, future efforts should be guided by knowledge of individualized risk factors and relevant theoretical approaches.

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CHAPTER 1

INTRODUCTION

An area of growing interest in higher education is the early identification of college performance using variables beyond the traditional admissions criteria, which may include motivational constructs, academic orientations, and additional demographic information. Traditional predictors of academic success at the college level typically include cognitive measures such as standardized tests and grade point averages; however, some researchers contend that inclusion of non-cognitive variables is necessary for adequate prediction of academic achievement (Astin, 1993; Beck & Davidson, 2001; Gifford, Briceño-Perriott & Mianzo, 2006; Harackiewicz, Barron, Tauer & Elliot, J.A., 2002; May, 1923; Munroe, 1945; Noftle & Robins, 2007; Thomas, Kuncel & Crede, 2007; Tinto, 1993).

With the current shift in national demographics, a shrinking admissions pool suggests that acceptance and retention of college students is more critical for institutions of higher education. According to the American Council on Education (2009), the demographic change results in fewer high school graduates, particularly in the Northeast region of the United States. In addition to changes in the size of the admissions pool, the values, attitudes and aspirations of college students have shifted markedly over time. Some of the most notable differences include heightened concern with regard to financing college, increased stress and emotional difficulties (self-reported and as evidenced by increased of use of university counseling centers), and stronger feelings of competitiveness for grades (Astin, 1998). According to Astin (1998), this “changing character of American college students” has a direct impact on higher education and will continue to influence the culture and climate on college campuses (p. 116). Thus, the decrease in college applicants coupled with the shift in attitudes, behaviors and beliefs of college students requires appropriate adjustment on the part of institutions of higher education. Not only may admissions strategies require modification in order to attract more applicants, but also institutions must reassess the types of campus structures that exist to support academic success and retention of incoming college students.

Retention is related to academic achievement given that college students who struggle academically persist at lower rates. These lower retention rates may be the result of involuntary departure due to action taken by the institution (i.e., academic dismissal) or voluntary exit, as college students are more apt to become discouraged and depart the institution or higher education altogether (Tinto, 1993). Students who have academic difficulty are not necessarily those who have been traditionally labeled "at-risk" (e.g., educationally disadvantaged students); instead, students in this category represent a wide range of cultural, ethnic and socioeconomic backgrounds as well as high school records and standardized test scores (Cruise, 2002). Students who gain entry through traditional college admissions processes (rather than special admit procedures) were predicted to succeed academically at the university. What either failed in the initial evaluation or interceded to adversely impact these students' academic performance? Are there other variables (i.e., motivational, demographic) that should be considered when predicting academic success at the college level?

Although institutions may factor in other predictors to some degree, college admission is still largely based on two cognitive variables: past performance, assessed with high school grades, and ability, typically measured using SAT or ACT scores (Harackiewicz et al., 2002). A host of non-cognitive variables have been identified as predictors of academic success at the college level, but are typically not employed in the admissions process. Factors such as effort, academic self-concept along with “values, motives, study and test taking skills, attributional style, self-efficacy, and even pragmatic factors related to financial resources (e.g., not needing to work outside of school)” are also important ingredients for academic success (Noftle & Robins, 2007, pg. 127). However, the availability of many of these factors during the admissions process makes their use impractical if not impossible.

As an alternate to being employed as pre-screening for the purpose of admission, a full range of factors related to academic achievement can be considered with regard to support services for college students who may have academic difficulty. Higher education institutions can reconsider how their current policies and services assist with both the identification and support of students who may achieve below the acceptable level. For example, interventions that focus solely on building academic skills may not address other factors that significantly impact achievement above and beyond cognitive variables, such as students’ personal development, motivation issues or academic orientation. Moreover, institutions should broaden the scope of support programs to address the needs of the whole student population. Support services for special populations (e.g., student-athletes, specially admitted students) are relatively standard; however, there is a general lack of understanding and support for a subset of students who have conventionally gone unidentified until they underachieve (Beck & Davidson, 2001).

Not only is the lack of broad-based identification of college students who may be at-risk of having academic difficulty an issue, but also the timing of support mechanisms that are offered. Specifically, assistance may come too late once students have been identified through a semester of poor grades. Since even one poor semester may be enough to discourage a first-attending college student, early identification of those most likely to fail would be advantageous (Beck & Davidson, 2001; Tinto, 1993). A proactive approach can be developed utilizing information available prior to the start of the first academic semester, including both cognitive and non-cognitive factors that impact academic achievement. If a support mechanism is in place before the start of course work, it may be possible to help a student avoid academic difficulty rather than react once it has been noted.

The purpose of the present study was to investigate the establishment of an early warning system and subsequent intervention with college freshmen, addressing both the academic viability and retention of first-year students. The two main goals of the study were to: a) validate the use of a prediction model to establish a system of early identification of first-semester college students who are at-risk of academic difficulty, and b) examine the efficacy of an intervention designed to support these students. The population of interest in the present study was first-semester students who are predicted to succeed by standard admissions criteria, but fail to achieve minimum academic standards at the university level. The primary focus of the present study was academic viability. A secondary, but related, interest was retention as it is a function of academic achievement. That is, students who do not perform at the expected level may decide to leave the institution prematurely or may be dismissed for failing to meet the minimum academic standards of the institution.

CHAPTER 2

REVIEW OF THE LITERATURE

The scope of the review of the literature includes predictors of academic performance, both cognitive and non-cognitive factors. Within the range of non-cognitive factors, motivational attributes are considered in depth. While cognitive factors are traditionally employed as predictors and, thus, are often more readily accessible at the time of college admission, non-cognitive variables may offer additional predictive power. Inclusion of both cognitive and non-cognitive variables may not only assist with early identification of college students who are at-risk for having academic difficulty, but may also assist in the design of interventions to support this subpopulation. Emerging research is presented regarding attempts to develop early warning systems and interventions, which include the use of cognitive and non-cognitive predictors.

Prediction of Academic Achievement in College

One of the most researched topics in higher education is academic achievement and, in particular, the ability to predict academic performance of college students. The main goal of the college admissions process is to predict the academic viability of applicants and provide entry to those who have the best chance of success at the institution. The body of work in the area of prediction of academic achievement suggests that college grade point average can be predicted with moderate accuracy from the information gathered during the admissions process. Admissions information typically includes the two most potent predictors of college GPA: high school GPA and college admissions test scores (e.g., SAT, ACT). Of the two predictors, high school grades have typically carried more predictive weight (Astin, 1993; Noftle & Robins, 2007; Stanley, 1971). However, measures of intellectual capabilities alone account for only a portion of the variability in academic achievement (Astin, 1993; Larose, Robertson, Roy & Legault, 1998; Tinto, 1993). Furthermore, a degree of uncertainty exists regarding the use of high school grades and college admission test scores, as research has indicated inconsistencies with use among subgroups of applicants such as first-generation college students and minorities (Astin, 1971; Freedle, 2003; Naumann, Bandalos & Gutlin, 2003; Zwick & Sklar, 2005) as well as well students with non-traditional curricular experiences in high school (Pribbenow, Phelps, Briggs, & Stern, 1999). Therefore, the use of non-cognitive measures could enhance the college admissions process.

Using a comparison to the medical model, Astin (1993) likens prediction of college student success to offering a prognosis based on a known set of input variables, which is possible due to the consistency of human behavior. More specifically, Astin (1993) states

> …it is possible to predict (prognosticate) from current information (input) what a person will be like at some later time (outcome). High achievers in secondary school (input), for example, tend to be high achievers in college (outcome). But we can make a better prediction as to whether this high achiever in high school will also be a high achiever in college if we have more input information on the student's ability, motivation, and family background. (p. 20)

Therefore, inputs such as a first-year student's past academic record, goals and aspirations and other relevant background information can be utilized to predict future educational outcomes.

Astin (1993) presents a framework in which he delineates types of data that can be collected in order to assess both cognitive and affective outcomes: psychological (internal traits) or behavioral (observable measures). Measures of cognitive (or intellectual) ability tend to dominate college admissions criteria. Examples of cognitive outcomes are knowledge, basic skills and aptitudes, ability to think critically, and overall academic achievement. However, noncognitive (or affective) processes can also be of use to educators. For example, self-concept, attitudes, drive and beliefs are affective, psychological outcomes that may impact academic performance in assessable ways (Astin, 1993). Consequently, consideration of both affective and cognitive measures is key in establishing the academic efficacy of the college student.

Historical View of the Prediction of Academic Achievement

While the theoretical perspectives may shift over time, considerations of psychological attributes have historically been infused into the prediction of first-year performance. In an early study of poor academic achievement in college, Miner (1910) considered the psychological attributes of "delinquent" (i.e., low performing) freshmen at the University of Minnesota. While the intellectual capacity of the students was sufficient to succeed at the college level, Miner's findings suggested that low achievement was attributable to moral (a.k.a. personality) traits, specifically the lack of "the organization and control of the emotions, desires and impulses" (p. 270). The remediation of poor academic performance would require going beyond the teaching subject matter, Miner submitted, instead becoming an issue of "developing habits of application, habits of resistance to the distracting temptations of other activities" (p. 271).

In his study of the prediction of academic success in college, May (1923) began with the goal of identifying all characteristics that would correlate highly (r = .90) with performance. May identified seven factors that contribute to academic achievement in college: 1) intelligence, 2) high school preparation, 3) industry or application to work, 4) mental efficiency or knowledge of how to use the mind, 5) interest and motivation in school work, 6) certain personality traits, and 7) personal health and surrounding environment. Recognizing the challenge of measuring all of these factors, May instead focused on high school preparation, measures of intelligence (i.e., Miller Mental Abilities Test and Dartmouth Completion of Definitions Tests), and application to work/industry (self-reported in number of hours devoted to work outside of the classroom), deeming the other traits to be immeasurable for the purpose of his study. May found that measures of intelligence were the most highly correlated with academic achievement, with optimal predictive power found in the pairing of intelligence and degree of application to school work. He noted, however, that degree of application cannot be known at the time of admission, therefore finding utility only as a recommendation to incoming students (May, 1923).

During the 1940's and 1950's, the application of the Rorschach test to prediction of college academic achievement was the subject of several research endeavors. Traditionally administered by a psychologist, the Rorschach is a psychometric test intended to derive information about the subject's personality characteristics and emotional functioning (Munroe, 1945). Recognizing the need to discover valid predictors of academic performance beyond measures of knowledge and ability, Munroe first began experimenting with its use at Sarah Lawrence College in 1940. In Munroe's estimation, aspects of character and personality were as important as cognitive factors when considering academic success. Noting a gap in research during the time of her work, Munroe (1945) believed "the important role of character in education has not been so much denied as neglected. Perhaps the reason for such neglect is the difficulty of measuring and evaluating personality factors objectively" (pg. 17). Munroe used an adapted version of the test, the "Inspection Rorschach," which allowed for a quick assessment of adjustment ability. The results of her research suggested that the Rorschach was useful in predicting those who would have academic difficulty at the institution despite having the intellectual capability to perform satisfactorily (Munroe, 1945).

Several follow-up studies were conducted on predictive properties of the Rorschach test, yielding mixed results. Corroborating its utility, Montalto (1946) noted patterns in Group Rorschach responses that distinguished achievers from non-achievers, while Osborne, Sanders and Greene (1950) found that certain types of weighted Rorschach responses (in combination with measures of scholastic ability) could predict college performance better than cognitive measures alone. Thompson (1951) was able to find modest support of the Group Rorschach, acknowledging the limitations with regard to the reliability of certain parts of the Rorschach and, thus, recommending continued research into the application of personality/adjustment measures in the field of achievement prediction. However, Sopchak (1958) was unable to replicate the results of the work of Montalto and Thompson, finding low correlations between the Rorschach test and students' grade point averages and ultimately determining that measures of cognitive ability (i.e., the California and ACE exam) were the most reliable predictors of academic success in college.

In 1971, Bailey published his study of self-concept and its relationship to academic achievement. Specifically, Bailey was interested in understanding the role of this particular non-cognitive factor on academic performance, investigating the differences in self-perceptions between achieving and underachieving students. The study utilized self-rating scales that Bailey developed as a measure of self-concept of ability and the Henmon-Nelson Tests of Mental Ability as the actual measure of students' college ability. The results of the study indicated that achieving students had higher self-concept of ability and smaller discrepancies between perceived and actual ability, suggesting that the role self-concept is significant when seeking to understand academic performance (Bailey, 1971). The relationship between self-concept and academic achievement continued to be of interest, evolving to include definition of the sub-construct of academic self-concept (Byrne, 1984; Marsh, 1990; Marsh, Byrne & Shavelson, 1988). Empirical evidence was found to support the belief that academic self-concept was more closely related to academic achievement than general self-concept (Byrne, 1984; Marsh, Byrne & Shavelson, 1988) and that a causal link exists between prior academic self-concept and future achievement (Marsh, 1990).

The impact of learning versus grade orientations became of interest in the 1980's. Eison (1981) developed the LOGO questionnaire, designed to determine which students were motivated by gaining new information (learning-oriented or LO) or achieving course grades (grade-oriented or GO). A subsequent study (Eison 1982) validated the instrument's ability to discriminate between the orientations as well as identified other attributes that coincided with each orientation. Specifically, "compared to GO students, LO individuals were more trusting, imaginative, self-sufficient and relaxed; had better study habits; experienced less debilitating anxiety; collaborated and participated in more classroom settings…" (Eison, 1982, pg. 868). Ensuing work by Eison, Pollio and Milton (1986) effected revisions to the instrument, resulting in the ability to scale students on both dimensions and consider additional nuances of the orientations in relation to other personality and educational characteristics.

Current Trends in Predicting College Academic Achievement

More recent research about prediction methods of college academic achievement has continued with the inclusion of traditional, cognitive performance measures in conjunction with non-cognitive variables such as personality traits, emotional intelligence, and a range of motivation variables. The studies have continued with the premise that past academic achievement in high school and scores on aptitude tests may not be the best predictors of college academic performance, particularly if relied upon solely or heavily in the admissions process. While some studies have supported the significant predictive value of high schools grades and aptitude test scores (e.g., Cambiano, Denny, & De Vore, 2000; Stricker, Rock, & Burton, 1996), others have proposed that their present utility is questionable in light of a shifting admissions pool (e.g., Pribbenow et al., 1999; Stern & Briggs, 2001). According to Pribbenow et al. (1999), "…empirical estimates of predictive validity have revealed that, taken together, high school GPA and standardized test scores explain somewhere between 25 and 45% of the variance in freshman year college grades" (pg. 3). Thus, researchers have sought to define additional criteria through which to judge the academic viability of college applicants, suggesting that additional variance in achievement could be explained (Chamorro-Premuzic & Furnham, 2003; Furnham, Chamorro-Premuzic, & McDougall, 2003; Lounsbury, Sundstrom, Loveland, & Gibson, 2003; Newsome, Day, & Catano, 2000; Thomas, Kuncel & Credé, 2007; Truell & Woosley, 2008; Wagerman & Funder, 2007; Young, 2007).

Personality

In relation to academic achievement, personality has been demonstrated to be distinct from intelligence and others measures of cognitive ability (Noftle & Robins, 2007). Research has established that personality has predictive power in relation to college academic performance when cognitive ability and intelligence are controlled (Newsome et al., 2000; Noftle & Robins, 2007; Wagerman & Funder, 2007). In particular, the Big Five personality trait of conscientiousness has been found to be most strongly linked to academic achievement (Furnham, Chamorro-Premuzic, & McDougall, 2003; Lounsbury et al., 2003; Newsome et al., 2000; Noftle

& Robins, 2007; Wagerman & Funder, 2007). While the specific labels may vary among instruments designed to measure personality, in general the facets of conscientiousness include organization, self-control, diligence, achievement-striving, and perfectionism (Lounsbury et al., 2003; Noftle & Robins, 2007).

In their study, Noftle and Robins (2007) examined the relationship between the Big Five personality traits and academic achievement as measured by SAT scores and both high school and college GPA. Across four different samples and four distinct personality inventories (the BFI, NEO-FFI, HEXACO-PI, and NEO-PI-R), the trait of conscientiousness was positively related to both college and high school GPA. Further, conscientiousness predicted college GPA after controlling for both high school GPA and SAT scores. Although accounting for a small percentage of variance, the findings suggested that "willingness to work hard" is a robust predictor of academic achievement (Noftle & Robins, 2007).

Wagerman and Funder (2007) sought to establish personality as a predictor of college academic achievement in addition to the traditional predictors of high school grades and SAT scores. The researchers utilized freshman and senior cumulative GPA (the latter of which they believed to be a more stable, comprehensive measure of achievement) as well as both self-report and informant ratings using the BFI. Their findings indicated that the personality trait of conscientiousness accounted for unique variance in both freshman (4.8%) and senior (9.3%) GPAs beyond the traditional predictors, suggesting that measures of personality could be utilized as an additional screening tool as part of the college admissions process (Wagerman & Funder, 2007).

Newsome et al. (2000) found support for the predictive power of personality through their research into the relationship between emotional intelligence and academic performance. Because of the previously established link between emotional intelligence and certain personality traits, the researchers included the construct of personality in the study by way of the 16PF, which includes the five global factors of extraversion, anxiety, tough-mindedness, independence, and self-control. While the researchers found no evidence to support the link between emotional intelligence and performance, two factors of the 16PF, extraversion and self-control, were found to be significantly correlated with academic performance. Specifically, "…individuals who were more introverted and those individuals who were more serious, rule conscious, perfectionistic, and grounded tended to have higher GPAs" (Newsome et al., 2000, pg. 1013).

Contrary to the above findings, Lounsbury et al. (2003) did not find support for a strong, predictive relationship between personality and academic achievement. The study explored how intelligence, personality and work drive account for academic performance at the college level. The researchers used the Personality Style Inventory (PSI) to measure the Big Five personality traits, a proprietary measure of work drive, and the Otis–Lennon Test of Mental Maturity to measure general intelligence. The results indicated that conscientiousness and openness appeared to account for variance in academic performance; however, once work drive was entered prior to personality variables in the regression analysis, the personality variables no longer added significantly to the prediction of course grade. The researchers recognized, however, that a limitation of the study was use of an individual course grade as the outcome variable rather than a more global measure of academic performance (i.e., GPA), thus indicating that further research is needed to explore the relationships among these variables (Lounsbury et al., 2003).

Motivational Attributes

While motivation has been of interest to psychologists for decades, it is of central importance when considering how students are motivated to engage in new learning. This area of research is challenging given that “the study of motivation...has been confounded with the field of learning; indeed, motivation often is inferred from learning, and learning usually is the indicator of motivation...” (Weiner, 1990, pg. 618). Research into the effect of motivation on learning is also confounded by the fact that learning is influenced by many other factors, including native intelligence. Currently, motivational research trends in education have evolved to include even greater focus on human behavior, particularly in achievement strivings. Also of increased interest are variables such as causal cognitions, efficacy beliefs, individual difference in achievement needs, learned helplessness, intrinsic versus extrinsic rewards, and the self as a determiner of success or failure (Weiner, 1990).

Within the study of motivation as it relates to higher education, there is a growing recognition of the need to integrate cognitive and motivational variables when considering academic achievement. According to Linnenbrink and Pintrick (2002), “much of the early research on student achievement and learning separated cognitive and motivational factors and pursued very distinct lines of research that did not integrate cognition and motivation” (pg. 313). However, research is becoming more focused on how these two sets of factors jointly interact to influence academic achievement. While many motivational theories exist, several key areas have been of primary interest in the literature. While it is important to understand each of the theories and the distinctions between them, it is just as critical to recognize the interconnections between the motivational constructs.

Academic Self-Efficacy

The concept of the self is at the forefront in motivation research, and the work of Albert Bandura is largely responsible for bringing about this trend (Weiner, 1990). One of Bandura's most significant concepts as it relates to academic achievement is that of self-efficacy, which refers to a student's belief about whether he/she is capable of successfully accomplishing a particular task, activity or assignment. Research has substantiated that "the contribution of self-efficacy to educational achievement is based both on the increased use of specific cognitive activities and strategies and on the positive impact of efficacy beliefs on the broader, more general classes of metacognitive skills and coping abilities (Chemers, Hu, & Garcia, 2001, pg. 55). In the realm of academic achievement, self-efficacy has been linked to retention, students' ability to use learning and problem-solving strategies, effectively manage personal resources (including time), set high achievement goals, and adjust to university life as a whole (Chemers et al., 2001; Devonport & Lane, 2006; Lasane & Jones, 1999; Linnenbrink & Pintrich, 2002; Wolters, 2003). The intertwining of self-efficacy with many key concepts related to academic achievement is illustrative of the importance to consider multiple theoretical perspectives concurrently.

Interested in how motivation impacts learning in college, Hsieh, Sullivan and Guerra (2007) conducted a study that considered both self-efficacy and goal orientation. Comparing college students in good academic standing (2.00 or higher GPA) to those who are on academic probation (less than 2.00 GPA), Hsieh et al. (2007) utilized six items from the Patterns of

Adaptive Learning Survey (PALS) to assess academic efficacy and eighteen items from the Achievement Goal Orientation Inventory that measured the three goal orientation subscales of mastery goals, performance-approach goals, and performance avoidance goals. Results indicated that GPA was positively related to both self-efficacy and mastery goal orientation. Further analysis suggested that students' adoption of mastery goals is linked with high self-efficacy, a combination that supports academic performance (Hsieh et al., 2007).

Devonport & Lane (2006) examined the relationship between self-efficacy and coping ability of college students, both of which they hypothesized support successful completion of coursework and persistence. The researchers developed a 40-item self-efficacy measure and utilized the MCOPE to assess coping strategies. The researchers found support for previously discovered relationships between self-efficacy and academic performance as well as a link between the use of active coping techniques and self-efficacy. The results lend support to the argument that "…students who develop their ability to cope, particularly the use of active coping strategies (such as seeking advice and time management), will experience a resultant increase in coping-efficacy. This increase in coping efficacy will then contribute to an increase in outcome-efficacy," thus influencing self-efficacy beliefs (Devonport & Lane, 2006, pg. 136).

Zajacova, Lynch and Espenshade (2005) explored the effects of self-efficacy and stress on academic performance as measured by freshman GPA, earned credits, and first-year retention. While the researchers noted that both self-efficacy and stress have been previously considered in studies related to academic performance, they were specifically interested in comparing the effects of these two related variables (i.e., stress can impact self-efficacy beliefs). Zajacova et al. developed a survey instrument that measured both self-efficacy and stress with regard to certain college tasks (e.g., writing papers). Results indicated that academic self-efficacy has a strong, positive effect on freshman grades and earned credits and, indeed, was the strongest predictor of GPA even when high school performance and demographic variables were included in the analysis. Persistence into the second year, however, was not found to be related to self-efficacy, and stress was not significantly related to any of the outcomes variables.

Attribution theory

Another important area in motivational research as it relates to academic achievement is attribution theory. Attribution theory centers on the individual's attempt to understand why events occur. Outcomes of an event will be analyzed, and the perceived causes for success or failure noted. According to attribution theory, "perceived causes can be divided into three dimensions: stability (how stable the perceived cause is, locus (whether the cause is internal or external), and controllability (whether or not the perceived cause can be controlled)" (Linnenbrink & Pintrich, 2002, pg. 317). Research suggests that attributing outcomes to stable, internal factors (i.e., ability or skill) offers the most possibility for achievement. Studies related specifically to academic achievement have shown that "…college students' attributions--how they explain their success or failure…influence students' motivation and goals for academic work" (Stage, 1999).

Understanding variables that contribute to academic achievement may be of use not only for the purpose of prediction, but also for intervention. Perry and Penner (1990) examined attributional retraining as an intervention method to support academic achievement. They argued that students' perceived control is the primary influential factor, as "loss of control represents a serious threat to college students' academic development because it causes helplessness-related cognitive, motivational, and affective deficits" (Perry & Penner, 1990, pg. 269). The study utilized the Multidimensional Multiattributional Causality Scale (MMCS) to assess internal versus external locus of control, categorizing those students who attributed failure due to lack of effort (internal) from those who attributed failure to lack of ability (external). Results indicated that attributional retraining positively impacted external-locus students, who were able to gain more knowledge from course lectures and more effectively use study materials after the intervention.

Goal Orientation

Related to but distinct from attribution theory is goal orientation or achievement goal theory. While attribution theory focuses on the reasons students perceive they are succeeding or failing academically, goal theory focuses on why students are striving to achieve. Goal theory links concepts of ego-involvement, competitive reward structure, and social comparison as indicators of success and ability attributions. The labels for the two main goals orientations differ among theorists, but tap into similar constructs. Most common in the research is the concept of mastery goal orientation versus performance goal orientation. Mastery goal orientation (i.e., task-involved) is the desire to improve ability and gain proficiency and knowledge in an area, while performance goal orientation (i.e., ego-involved) focuses on extrinsic rewards such as grades and approval from others (Eccles & Wigfield, 2002). Generally, research has found that students with a stronger mastery goal orientation tend to have more adaptive motivational and cognitive outcomes (Ames, 1992; Fenollar, Román, & Cuestas, 2007; Heyman & Dweck, 1992; Hsieh et al., 2007; Young, 2007).

As previously referenced, Hsieh et al. (2007) examined self-efficacy and goal orientations of two groups of college students, those in good academic standing (2.00 GPA or higher) and those on academic probation (below 2.00 GPA). Using eighteen items from the Achievement Goal Orientation Inventory, the researchers scaled students along three main orientations of “developing and improving ability (mastery goals), demonstrating ability (performance-approach goals), and hiding lack of ability (performance-avoidance goals)” (Hsieh et al., 2007, pg. 455). The researchers found that self-efficacy and mastery goals were positively related to academic standing while performance-avoidance goals were negatively related to academic standing. Further, results indicated that within the group of students who reported high self-efficacy, the subset of students on academic probation reported significantly more performance-avoidance goals. The findings suggest that identifying at-risk students based on self-efficacy alone may not be sufficient, suggesting that goal orientation should be included among the predictors. Further, Hsieh et al. recommended that interventions with at-risk students should be designed to support formation of effective belief and goals systems.

Young (2007) sought to validate the use of achievement goal measures as a predictive tool for college academic achievement. Based on the multiple goals perspective in achievement goal theory, the Multiple Goals Theory Measure of academic motivation (MGMT) was developed to measure each of four goal orientations: mastery approach, mastery avoidance, performance approach, and performance avoidance. The researcher was interested in determining if the four sub-scores of the MGMT were correlated with college grades and could indeed be significant incremental predictors of performance above SAT and high school grades. Results of the study indicated that mastery sub-scores provided improved predictive validity when considered with the traditional measures, particularly with male and minority students. Moreover, Young suggested that the MGMT may be utilized as a screening tool to identify students entering college who may be at risk of having academic difficulty (i.e., students attaining low mastery approach and high avoidance scores).

Self-Regulation

Woven throughout many of the aforementioned studies is the concept of self-regulation in learning situations. Self-regulated learners are characterized as possessing knowledge and strategies needed to learn and remember information as well as having the skills to effectively apply these resources to learning and memory tasks (Peverly, Borbst & Graham, 2003). These individuals are conceptualized as having greater control over behaviors, thoughts and emotions along with the ability to manage time, persist and delay gratification when required (Barber, Munz, Bagsby & Grawitch, 2009). In some earlier studies of self-regulation, it had been assumed that adults are skilled self-regulators; however, much of this research was conducted using simple materials rather than the more complex learning situations to which college students would be exposed. In order to address this gap in the research, Peverly, Borbst, and Graham (2003) conducted a study with college adults, exploring the effect of their test preparation on examination performance. Contrary to prior research, their study found that college students were not able to accurately predict their own performance, nor were the results of the exams related to the amount of time spent on notes or the content of notes. Thus, the researchers concluded that it cannot be taken for granted that college undergraduates are self-regulated learners, and interventions for college students must take into consideration that study skills alone (e.g., note taking, test taking strategies) are not enough to assure academic success (Peverly, Borbst & Graham, 2003).

Barber, Munz, Bagsby and Grawitch (2009) conducted a study on the moderating effects of self-control (a.k.a. self-regulatory strength) on the relationship between time perspective and academic achievement of college students. The researchers hypothesized that the psychological disposition of time perspective (future versus present orientation) may be impacted by an individual's ability to exert self-control in reaction to external demands of academic work. The participants were asked to complete scales related to both time perspective and self-control along with self-reporting of their ACT scores and other demographic variables (e.g., age, gender, and race). The results of the study suggested that time perspective was related to college GPA, in that students who had future orientations achieved stronger grades; however, this relationship between time perspective and GPA was only noted in the low self-control students. In high self-control students, time perspective was not a predictor of academic achievement. Barber et al. (2009) suggest that "having a stronger present orientation in conjunction with a high level of self-control appears to provide a valuable resource to overcome a dispositional cognitive bias that otherwise may lead to lower academic achievement" (p. 252). The authors note that while self-regulation was considered an ability for the purpose of their study, other research suggests that it may be regarded as a skill that can be strengthened through targeted practice (Baumeister, Galliot, DeWall & Oaten, 2006). Thus, interventions could conceivably be developed to target the enhancement of self-regulatory behaviors.

Additional Psychological Constructs

Emotional Intelligence

Within the last 15 years, emotional intelligence (EI) has gained in popularity as a topic of study (Bar-On, 2010), which includes the examinations of its relationship to academic achievement. While several models of emotional intelligence have been developed, the Bar-On model of emotional intelligence in particular has been utilized in several recent studies about its relationship to academic performance in college (Newsome et al., 2000; O'Connor & Little, 2003; Parker, Summerfeldt, Hogan, & Majeski, 2004). According to Bar-On (2010), his model asserts that " emotional-social intelligence is an array of interrelated emotional and social competencies and skills that determine how effectively individuals understand and express themselves, understand others and relate with them, and cope with daily demands, challenges and pressures" (pg. 57). The model includes five meta-components: intrapersonal (self-regard, emotional self-awareness, assertiveness, independence, and self-actualization); interpersonal (empathy, social responsibility, and interpersonal relationship); stress management (stress tolerance and impulse control); adaptability (reality-testing , flexibility, and problem solving); and general mood (optimism and happiness).

Studies about the relationship between emotional intelligence and academic achievement have yielded mixed results. In order to assess the predictive validity of emotional intelligence, Newsome et al., (2000) conducted a study that included the use of Bar-On's Emotional Quotient Inventory (EQ-i) along with the Wonderlic Personnnel Test as a measure of cognitive ability and the 16 PF to assess students' personality. When correlated with GPA, the Wonderlic and extroversion and self-control aspects of the 16PF were significantly related; however, no significant relationship with the EQ-i or its subscales was found, suggesting minimally that the EQ-i is not a valid prediction tool or perhaps the construct of emotional intelligence is not related academic achievement.

In a later study, Parker, Summerfeldt, Hogan, and Majeski (2004) addressed what they perceived as flaws in the study by Newsome et al. (2000). Parker et al. (2004) believed the broad spectrum of students (i.e., traditional and non-traditional, full- and part-time, lower- and upper-classmen) to be problematic, as the concerns of these subgroups differ dramatically. As such, the study was limited to full-time students who were experiencing the transition from high school to college. The researchers utilized the EQ-i and EQ-i Short and compared two groups of students at the end of the first academic year: academically successful students as defined by a GPA above 79% and academically unsuccessful students as defined by a GPA below 60%. While correlations using the full group of subjects yielded similar, non-significant results as Newsome et al., Parker et al. found support for the predictive ability of several of the subscales (intrapersonal, adaptability, and stress management abilities) when conducting an analysis at the group level, suggesting a narrower range of application is appropriate.

Locus of Control

Interested in improving the admission screening process, Gifford, Briceño-Perriott and Mianzo (2006) examined the psychological construct of locus of control as a predictor of college academic achievement and retention. Locus of control refers to the ascribing of control over life events as either internal (both positive and negative events can be influenced by personal behavior) or external (events are determined by outside forces that cannot be personally influenced). Using the ANS-IE to measure locus of control, the researchers correlated these scores with ACT scores and first-year cumulative GPA of a sample of first-year freshmen. The results indicated that both locus of control and ACT scores were significant predictors of GPA, although together only accounting for 7% of the variance in first-year academic performance. Those students who were scored as “internals” on the locus of control scale earned significantly higher GPAs that “externals.” The researchers suggested that locus of control could serve as a pre-college predictor of achievement, providing an additional measure during the admissions process (Gifford et al., 2006).

Psychosocial Attributes

Concerned with both academic achievement and retention, DeBerard, Spielmans, and Julka (2004) considered a variety of psychosocial variables in addition to the traditional predictors of high school grades and SAT scores. Specifically, the researchers assessed social support, coping strategies, health-related quality of life, smoking and drinking behaviors, and other demographic information during the first week of the freshmen year. Using a logistic regression analysis, the results indicated that 56% of the variance in first-year GPA was accounted for the variables (which included the traditional predictors). DeBerard et al. (2004) discussed the application of the model as a tool to identify students who are at risk for academic difficulty in the first year as well as a guide for designing “proactive intervention strategies for maladaptive behaviors predictive of poor academic performance (e.g., smoking, binge-drinking, social support, coping)” (pg. 72).

Academic Orientations

With a foundation in the LOGO scale (Eison, 1981, 1982; Eison, Pollio, & Milton,1986), Davidson, Beck, and Silver (1999) sought to further define and measure academic orientations for the purpose of gaining a better understanding of and application to the achievement of college students. While Davidson et al. considered the LOGO scale to be of value, the researchers believed that a broader array of orientations would more fully define how students view their academic environment. The result of their research led to the creation of the Survey of Academic Orientations (SAO), a 36-item questionnaire that measured six distinct academic orientations: structure dependence (lack of tolerance of ambiguity and strong need for order), creative expression (preference for expression, discussion, and learning for its own sake), reading for pleasure (consider sources beyond what is required; wide array of materials), academic efficacy (exhibit confidence; lack self-doubt), academic apathy (disinterested in learning, but interested rather in the appearance of academic success), and mistrust of instructors (believe professors are trying to trick them and are not truly interested in their success; attribute failures externally). By compiling the responses, an overall adaptiveness index (AI) could be obtained, which suggests whether a student's orientation is related to positive academic performance.

In a follow-up study, Beck and Davidson (2001) examined the predictive validity of the SAO with the academic performance of first-semester college students. The goal was to establish if the SAO could add significantly to the prediction of first-year performance beyond the SAT and high school grades. After the scores were regressed with first-semester GPA's, the findings suggested that the SAO did in fact add significantly to the prediction of academic performance, with academic efficacy and academic apathy found to be the strongest predictors among the six orientations. Beck and Davidson discussed the application of the SAO as part of an early warning system with the goal of identifying those students who may struggle academically.

Academic Difficulty in the First Year of College

"Attrition is, for most institutions, most frequent during the first year of college. Nearly half of all leavers depart before the start of the second year" (Tinto, 1998, pg. 169). Despite the best efforts made by institutions to predict the success and persistence of college applicants, many entering freshmen experience difficulty in their first year of college. This difficulty may be due to a range of variables, including the difference in academic tasks expected of them in college versus high school (Simpson, 2002), handling new and existing relationships with friends and family, and functioning independently with unfamiliar adult responsibilities (Pancer, Hunsberger, Pratt, & Alisat, 2000; Parker et al., 2004). Additionally, many students may have difficulty with the transition to university life due to unrealistic, simplistic expectations about the demands that their studies will entail, thus contributing to stress while seeking to adapt to the unanticipated challenges (Pancer, et al, 2000).

While many first-year students are able to work through the difficulty and succeed academically, there is a subset of students who do not achieve the required grades to make academic progress toward a degree. At many institutions, students whose grade point averages fall below predetermined criteria are placed on academic probation and may eventually face academic dismissal should improvement not be made. A variety of methods and techniques are employed by institutions to assist students who are having academic difficulty. Students who have academic difficulty often exhibit poor study habits teamed with a lack of coping skills for problem solving (Heisserer & Parette, 2002). While traditional support for academic skill mastery (i.e., tutoring services) may be suggested, intrusive advising techniques are also recommended for this population. Intrusive advising encompasses deliberate interventions to enhance student motivation and requires strategies such as frequent contact, developing close relationships between adviser/advisee, mandatory meetings, and student success workshops. The research available on intrusive advising techniques has demonstrated success with students who have been placed on academic probation (Cruise, 2002; Earl, 1988; Heisserer & Parette, 2002).

Probation interventions range from requiring mandatory meetings with academic advisers to requesting attendance at student success seminars and/or workshops. To a lesser extent, full-semester courses have been utilized with probation students and have met with some success (Lipsky & Ender, 1990). A list of probation interventions is readily attainable from the National Academic Advising Association (NACADA), which provides resources for the purpose of benchmarking best-practices among institutions (2003). While these types of probation interventions may meet with varying degrees of success, the identification of students that could benefit from such programs does not occur until at least a semester of grades has been earned.

Early Identification

An emergent area of research concerns earlier identification of college students who may be at-risk of substandard academic achievement and, thus, potentially departure from the institution. Rather than establishing a set of criteria through which to screen applicants, the intention is to detect and classify those students who have already been admitted to the institution, but may require additional assistance to succeed academically. What is often lacking from institutions of higher education is an "early warning system," a "mechanism for indentifying students most likely to fail academically or to encounter serious problems assimilating to the college environment" (Beck & Davidson, 2001, pg. 709). While subpopulations such as student-athletes and special-admit students typically have support systems in place upon admission, the struggle and/or underachievement of traditionally-admitted students often go unnoticed until a semester or more of poor performance.

While several of the aforementioned studies mentioned the potential application of their findings to an early identification system for academically at-risk students (DeBerard et al., 2004; Devonport & Lane, 2006; Hsieh et al., 2007; Peverly et al., 2003; Young, 2007), none demonstrated a formalized approach for doing so. At the time of the present research, only a few studies that represented explicit efforts to detect those who were at-risk among the general student population were found. The most comprehensive example is the research conducted by Beck and Davidson (2001), which validated a new instrument (Survey of Academic Orientations) designed with the intent to establish such an early warning system. The SAO was administered during the early part of the first semester of study, and individual student scores were made available to relevant staff and faculty, thus allowing the opportunity to target students who needed additional support during a critical adjustment period.

Another such study was conducted both for the purpose of identifying at-risk students as well as assessing new student transition programs. Focused on retention as the outcome variable, Murtaugh, Burns & Schuster (1999) conducted a survival analysis to discover what factors were related to students leaving the institution. The researchers believed that traditional pre-college predictors did not provide a full explanation of the variation in attrition. In addition to identifying risk characteristics, Murtaugh et al. were interested in establishing the effectiveness of existing college transition programs such as new student orientation and a Freshman

Orientation Course. The findings led to identification of at-risk groups, which included out-of-state students, minority students, and the age of incoming students. Further, the researchers discussed the development of interventions for subgroups based upon the findings, which included specialized marketing efforts during the admissions process, a new week-long new student orientation, and a revised Freshman Orientation course (Murtaugh et al., 1999).

Early Intervention

As noted by Tinto (1998), the timing of an intervention with first-semester students is critical, "… especially during the first ten weeks when the transition to college is not yet complete and personal affiliations are not yet cemented" (pg.169). With a lack of additional criteria by which to predict an individual student's future academic performance at the time of admission, generalized first-year transition programs are offered at many institutions. Interventions to assist first-year students with adjustment to college include mentoring programs, freshman experience courses, learning communities (co-registration and/or linked courses), themed residence halls, academic progress reports, and specialized advising efforts (Bigger, 2005; Tinto, 1998). While efficacy of first-year initiatives has been established for programs at many institutions, transition assistance is not available at all institutions, nor may it be available to every incoming student, if offered at all. Moreover, if first-year transition programs are not mandatory, students may choose not to participate, having perhaps underestimated the potential, personal benefit of these types of programs.

The application of research findings by Murtaugh et al. (1999) provides an example of a well-timed support system for incoming students. The improved week-long orientation process prior to the start of the semester along with a first-semester freshman course strengthened the transition support at the institution, particularly for their at-risk sub groups. However, the programmatic changes were made at the institutional level rather than by addressing individual student risk.

Alternatively, the research performed by Beck and Davidson (2001) resulted in an individualized approach with at-risk students. At the university that provided the sample for the study, the SAO was incorporated into an early warning system for first-semester students. By using the SAO scores in combination with SAT and high school grades, academic advisors were able to classify those students who would be at risk for academic difficulty. Since advising centers are often understaffed (resulting in high student to advisor ratios), early identification supported the focusing of efforts on students who were predicted to have achievement issues. Beck and Davidson acknowledged that follow-up research needs to be conducted in order to determine if the early identification of at-risk students and subsequent advising efforts yielded positive results.

Given the range of cognitive and non-cognitive predictors that have been studied both historically and recently, institutions of higher education have options beyond traditional predictors of academic achievement. Institutions can elect to utilize additional measures for screening applicants as part of the admission process or the early identification of at-risk students for the purpose of guided interventions. An overarching consideration is the availability of such information at the time of admission or prior to the start of the first semester of study. Moreover, an institution must consider the feasibility of the administration of additional measures to college applicants or admitted students. As such, the decision to use additional predictors of academic performance requires a balance between the application of theory and the confines of practicality.

Research Goals and Questions

While prediction based upon cognitive and affective variables may help to identify those students who may be at-risk, an accompanying interest is the potential for intervening to improve the academic outlook of at-risk students during the first critical year. Therefore, the goal of the present study was to both identify at-risk students and implement a targeted intervention from the earliest point of contact with the students throughout their first academic year, tracking academic progress at key points. Historical data gathered from a previous cohort of freshmen was utilized to develop a risk model that was applied to an incoming cohort of students. First year academic performance (as defined by cumulative GPA) and retention data as well as qualitative data (i.e., content of academic advising sessions) was considered in the analysis.

For the purpose of this study, the risk equation was based upon the analysis of variables that were available at the time of the students' entry into the institution along with information gathered during new student orientation prior to the first academic semester. The information available prior to the start of the first academic semester consists mainly of measures of cognitive ability (e.g., high school GPA, SAT scores, performance on the university's placement examinations); however, supplementary information gathered during new student orientation also includes additional demographic information (including financial background and work plans), high school performance, academic interests, self-assessed academic skills and basic motivational attributes. The study proposed to address two main research questions: 1) do the factors identified in the risk equation based upon the 2007-08 cohort of freshmen indeed predict academic performance of the 2008-09 cohort of freshmen, and 2) can a targeted intervention based upon those factors effectively offset their negative impact?

Figure 1 represents a logic model for the development of the intervention, which was based on theoretical background (e.g., prediction models, intrusive advising practices) as well as practical considerations (i.e., limited resources in terms of staffing).

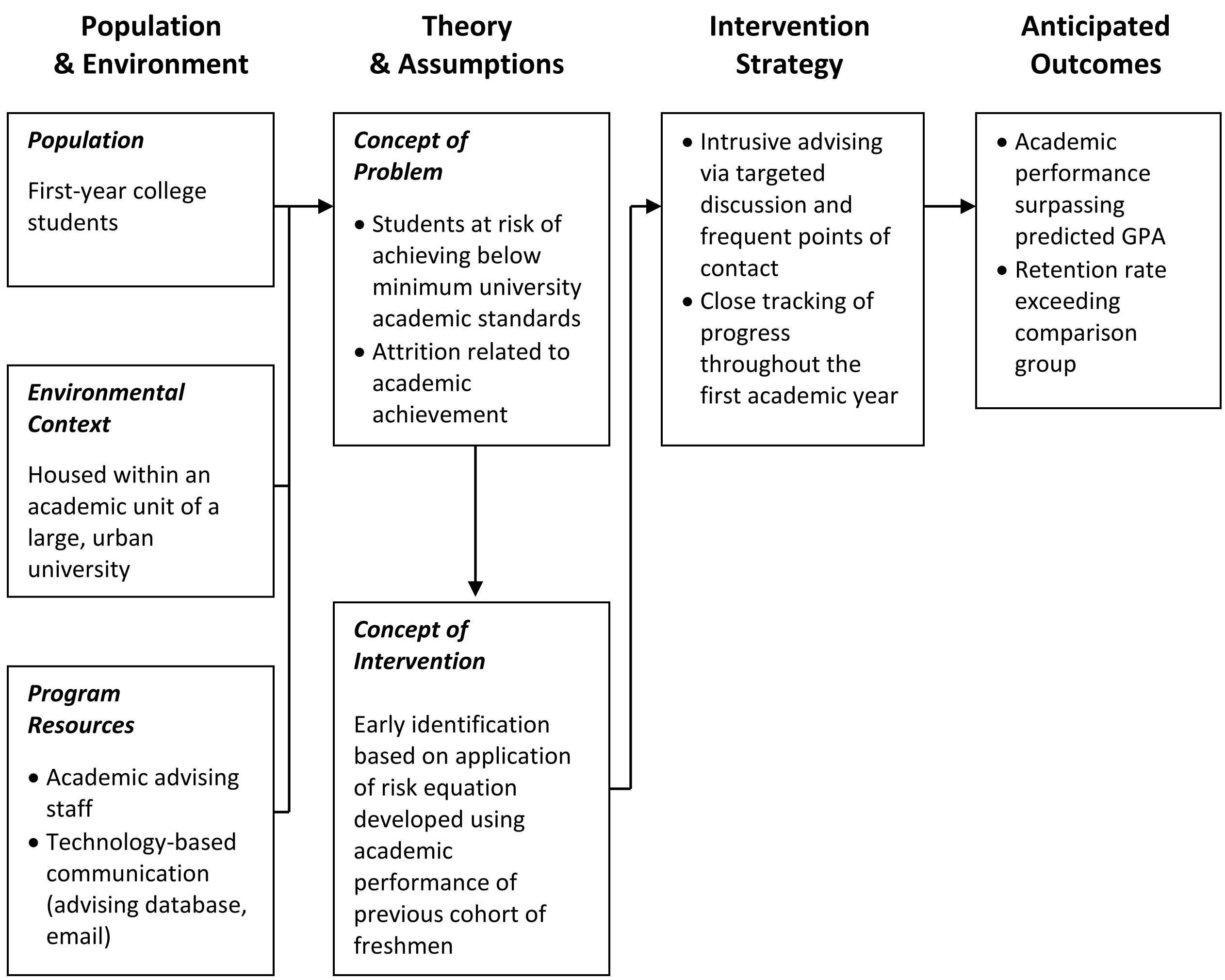

Figure 1. Logic model for the risk intervention.

CHAPTER 3

METHODOLOGY

Study Setting and Research Design

The study was conducted at a large, urban public research university in the northeastern region of the United States. The study included two phases: 1) the development of the risk prediction equation and 2) the application of the risk prediction equation, which included the identification of and subsequent intervention with students who may be at-risk for substandard academic performance. The first phase of the study was initiated by the institution's office of Institutional Research, who was responsible for the development of the risk prediction equation. The second phase of the study was conducted by the present researcher in an action research project within an advising unit at the university. The two main research questions addressed by the study were: a) does the risk prediction equation effectively predict academic performance and, thus, lend itself to the establishment of a system of early identification of first-semester college students who are at-risk of academic difficulty, and b) is the intervention designed for students who have been identified as academically at-risk effective in improving predicted academic achievement.

Phase One

The initial phase of the study included the creation of the risk prediction equation utilizing the 2007-2008 cohort of freshmen at the university. The office of Institutional Research performed an ordinary least squares regression analysis using data collected at the time of admission and during new student orientation. The variables included high school GPA, SAT scores, scores on the university's English and Mathematics placement examinations, college affiliation of the incoming student, involvement in a special admission program (e.g., support center for students who were offered admission with the expectation of participation in a summer bridge program to remediate academic skills), and responses to items on the New Student Questionnaire that is administered during orientation (see Appendix A). The following equation resulted from the analysis:

Predicted First-Semester GPA = -10.590 + .240 High School GPA + .001 SAT Writing + .038 New Student Questionnaire composite score + .096 Item17 + .069 Item 5 + .695 College affiliation + .023 Math placement section 3 + .067 Item 74 + .062 Item 59 + .008 English placement reading score + .051 Item 80 + -.033 Item 78 + -.037 Item 62 + -.027 Item 31 + .047 Item 67 + -.039 Item 57 + -.141 Special admission program + -.036 Item 34 + .062 Item 36 + -.027 Item 29 + .012 Math placement section 1

The cross-validation correlation was $r = ^{-}0.50$, $r^2 = .25$.

Risk categories were developed using deciles and, in turn, risk levels were assigned ranging from 1-10 based on predicted GPA. Level 1 indicated those students who were most at-risk for substandard academic performance, while level 10 were those least at-risk. Tables 1 and 2 present data from the Fall 2007 cohort of entering freshmen, both university-wide and within the academic division participating in the study respectively.

Table 1.

Risk Categorization and First-Semester GPA for 2007-08 Entering Freshmen[a]

Risk Level	*n*	Predicted GPA	Fall 2007 GPA
1	326	2.14	2.21
2	327	2.42	2.38
3	346	2.55	2.55
4	349	2.66	2.65
5	354	2.75	2.72
6	366	2.85	2.86
7	377	2.95	2.93
8	387	3.07	3.07
9	397	3.22	3.25
10	397	3.52	3.51

Note: Excludes entering freshmen in participating academic division.

[a] *N*=3,626.

Table 2.

Risk Categorization and First-Semester GPA for 2007-08 Entering Freshmen in Participating Academic Division[a]

Risk Level	*n*	Predicted GPA	Fall 2007 GPA
1	112	2.12	2.05
2	106	2.43	2.33
3	92	2.55	2.62
4	93	2.66	2.63
5	84	2.76	2.82
6	75	2.85	2.89
7	58	2.96	3.00
8	55	3.07	3.15
9	44	3.24	3.35
10	42	3.49	3.57

[a] *N*=761.

Upon comparing the data from the participating academic division to that of all entering freshmen at the university, the skewed nature of cGPA was noted and taken into consideration during the analysis of the data.

Phase Two

The second phase of the study included the application of the risk prediction equation that was developed using the 2007-08 freshman class to the 2008-09 cohort of first-attending freshmen. Students who were identified as most at-risk (risk levels 1 and 2) within the academic division received the intervention and were tracked throughout the academic year. The determination was made to intervene only with risk levels 1 and 2, as these students' predicted GPA was most in jeopardy of falling below the 2.00 university standard for satisfactory academic performance.

Sample

In order to address the first research question, the risk equation was applied to all incoming freshmen in the 2008-09 cohort, and each was assigned a risk level from 1 to 10. For the purpose of this study, students who were in special admission populations were excluded from the analysis. The reason for the exclusion is two-fold: 1) these subpopulations were not the focus of the study, as research has already been completed on students who are traditionally identified as "at-risk" and 2) students in special admit programs at the institution receive specialized advising and support services and, therefore, would act as a confounding variable in the study.

In order to address the second research question, the intervention was carried out with incoming freshmen in the 2008-09 cohort categorized as risk level 1 or 2 within the academic division participating in the study. The remaining freshmen who were categorized as risk levels 1 and 2, but who were admitted to schools and colleges outside of the participating academic division, did not receive the intervention. This group of incoming students who entered the university at the same time as the experimental group, but were admitted to other schools and colleges within the university, then served as the comparison group when conducting analyses of the efficacy of the intervention. Special admission populations were excluded from the comparison group as well.

Instrumentation

In addition to the information provided on the application for admission, the study utilized data gathered through the New Student Questionnaire, a proprietary instrument designed by the office of Institutional Research at the university (see Appendix A). The New Student Questionnaire was an 81-item survey administered to all incoming students while the university's placement examinations were being administered as part of new student orientation. The questionnaire was a self-report survey that included items soliciting demographic information (including items related to financial status and plans to work during the academic year), factors that contributed to the student's selection of institution, high school performance, academic interests, self-assessed academic skills and basic motivational attributes.

The placement examinations included a test of ability in English and Mathematics. The exams were required of all incoming freshmen in order to assess mastery of specified basic skills and establish readiness for college-level coursework in these areas. The placement exams were proprietary and were specifically designed for first-year English and Mathematics requirements at the university. The English placement exam included both a written essay and a multiple-choice component to assess skills related to sentence structure, rules of written English, and reading comprehension. The Mathematics placement exam was a three-part multiple-choice examination that does not allow the use of calculators. The first part of the exam assessed skills in basic arithmetic, the second algebra, and third calculus readiness.

A component of the intervention included the utilization of the division's academic warning and probation program, an online course designed to education students about their academic status and methods to improve their performance. The program included two instruments that were designed in-house: the Academic Performance Self-Assessment (see Appendix B) and the Academic Warning and Probation Program Quiz (see Appendix C). The self-assessment facilitated students' consideration of factors that contributed to their poor academic performance while the quiz was designed to test factual knowledge gained in the presentation portion of the online course. Results of both instruments were used as discussion points during the course of one-on-one meetings between the students and academic advisors.

Procedure

Identification

Prior to each new student orientation session, a list of students and their corresponding risk categories was supplied weekly to the participating advising center by the department of Institutional Research. The advisors who implemented the intervention within the academic division will be kept blind to the individual student characteristics and item responses that led to their risk level assignment. The students who were assigned risk levels 1 and 2 were designated to meet only with the academic advisors who have been apprised of the study and trained to administer the intervention. The students were not aware, however, of their risk categorization.

Since students were eligible to retake the Mathematics placement exam, it was possible that a student may either be reassigned a risk classification (1 to 2) or be removed entirely from the study if classified at-risk level 3 or above. Any change to a participant's risk classification that resulted in removal from the study was noted.

Intervention

Using the principle of intrusive advising, the intervention called for multiple contacts with each student. The first in-depth meeting was held during new student orientation, at which time students are obtaining the results of their placement exams and selecting appropriate courses for their first semester of study. Both the second and third points of contact occurred during the course of the fall semester: the second after mid-semester progress reports in lower-division courses became available, and the third prior to the final examination period. After the conclusion of the fall semester and prior to the spring semester start, the next point of contact was specifically for those students who did not meet with university's minimum academic standards and were thus required to complete a mandatory academic warning and probation program. Spring semester follow-up for all students included contact once mid-semester progress reports became available. Lastly, students who had not registered for the fall 2009 semester were contacted regarding their lack of registration and academic status.

The intervention was administered by the academic advising unit participating in the study. In order to ensure consistency in the treatment (i.e., intervention), four academic advisors within the unit were selected to participate in the study based on level of experience in the advising center. This subset of advisors was provided with training by the researcher. Specifically, the academic advisors were informed about the nature of the study, the protocols for the intervention, and the subsequent required documentation of interactions with the participants. The intervention team (which included the researcher) met on a regular basis to review the protocols and ensure uniform implementation. Electronic messages were crafted and delivered by one academic advisor, thus contributing to consistency of the treatment.

First Contact

While all incoming students in the participating academic division met with an academic advisor during new student orientation to view major interests and course selection, a special set of probing questions were developed for use with the study participants in order to initiate conversation about key risk factors (see Appendix D). The questions were designed to address the variables in the risk predication equation that could potentially be impacted, rather than immutable characteristics. For example, high school GPA is a variable that was established prior to admission and cannot be altered. Alternatively, hours of work during the school year may be flexible and influenced by a recommendation (see Appendix A, Item 5, New Student Questionnaire).

Depending upon the responses to the probing questions, academic advisors made suggestions that support academic success. Using the example of work hours, a student reporting plans to work more than the recommended allotment was advised to work 20 hours or less and attempt to find an on-campus job as well as informed of the formula for computing course preparation time per credit **(**see Appendix D, Conversation Points for Incoming Risks Students). After the initial meeting with an academic advisor during new student orientation, notes of the session were made in the academic advising database, and the customized session report was sent to the participants via the online student information system.

Due to change of major after placement testing, a subset of participants was identified as risk level 1 or 2 after their new student orientation meeting. As such, this group of students received only the standard advising session at the time of orientation. The risk students who were correctly identified prior to the start of semester received a phone call from an academic advisor who reviewed the additional conversation points. This subset of students also received a customized advising session report based on the conversation with the advisor.

Second Contact

The next contact with the participants was made after mid-semester progress reports became available. Mid-semester progress reports are evaluations of student progress that occur by the end of the fifth week of the semester, indicating either satisfactory or unsatisfactory progress in each lower-division (freshmen or sophomore level) course at the university. Areas of unsatisfactory performance may include low grades, missing grades/assignments, poor participation, poor attendance and/or or non-attendance. All students at the university receive notification that mid-semester ratings are available in their online student information account. For risk level 1 and 2 students within the division participating in the study, additional contact was made by the academic advising unit. Specifically, an email message was sent to any student who received at least one unsatisfactory course rating. The correspondence provided recommendations for how to address unsatisfactory progress in a course and included an invitation to meet with an academic advisor to further explore the issues surrounding performance (see Appendix E).

Third Contact

The third point of contact (and the last contact for the first semester) was made just prior to the university's final exam period. Risk level 1 and 2 students within the division participating in the study were supplied via email with recommendations for both preparing for and taking college final examinations (see Appendix F). The suggestions focused not only on study skills, but also how to manage both physical and emotional health during the final examination period. A link to the university's online final examination schedule was provided. Lastly, the email message included an invitation to meet with an academic advisor to discuss any questions or concerns regarding the students' first semester.

Academic Warning and Probation Program

At the conclusion of the fall semester, academic status of all university students is determined centrally. Notifications are sent out through the office of the Registrar to students who have not met the university's minimum academic standard of a 2.00 GPA and have been placed on academic warning or probation (Note: students who have accumulated fewer than 30 credits are placed on academic warning rather than probation per the university policy). Students who are placed on academic warning or probation are ineligible to self-register and must meet with an academic advisor for registration assistance. In addition to the central notification system, a message was sent by the academic division to any of its students who did not meet the minimum standards, informing them of the division's mandatory academic warning and probation program (see Appendix G for email notification). Any risk level 1 and 2 students who fell below the minimum 2.00 GPA were placed on academic warning and, thus, required to participate in the program. This constituted an additional level of the intervention for those students who were not performing adequately in their first semester of study.

The academic warning and probation program (which was in existence prior to the study) included the following: the Academic Performance Self-Assessment, a self-report survey that asked students to identify factors that contributed to their poor academic performance (see Appendix B); a self-directed online course, which presented information regarding the university's academic standards and recommendations to improve performance; the Academic Warning and Probation Program Quiz to assess knowledge of the information provided in the online course (see Appendix C); and a one-on-one session with an academic advisor to have an in-depth discussion of the factors that led to the students' poor performance and how to improve their academic situation. In order to ensure students' participation, a hold is placed on their account, preventing any further registration until they complete the program.

Spring Semester Follow-Up

Once again in the spring semester, participants were contacted via email after mid-semester progress reports became available. Due to additional staffing limitations during the spring semester, the academic advising unit opted to concentrate efforts on risk level 1 students only, as this group was the most at risk for substandard achievement. In addition to contacting risk level 1 students with indications of unsatisfactory work, the academic division sent congratulatory messages to those students who received satisfactory ratings. Both messages included an invitation to meet with an academic advisor to address issues and discuss their experience in the first year of studies (see Appendix H).

Final Contact

The last point of contact occurred just prior to the Fall 2009 semester. The goal of this final point of contact was to address retention into the second academic year. Messages were sent via email to study participants who did not register for the upcoming semester (see Appendix I), encouraging registration and offering assistance. For the subset of students who did not achieve the university's minimum academic standards, the message included instructions to complete the academic warning or probation program. Both sets of students were provided with information with regard to accessing advising services.

During the 2008-09 academic year, the contributing advising unit was the sole participant in the pilot year of the study, and the contacts as described above were unique with regard to standard advising practices across the university during new student orientation, all fall semester contacts, and mid-semester progress reviews. One notable exception for the spring semester, however, was an existing academic warning and probation program in a comparable advising unit. In addition to the above statement regarding the unique nature of the risk intervention, analyses of advising activities were performed (as detailed in the Data Collection and Analysis section).

Data Collection and Analysis

Both quantitative and qualitative data from the 2008-09 academic year were considered in the analysis. Maintained centrally by the university, the study utilized quantitative data including both Fall 2008 and Spring 2009 semester GPAs and cumulative GPA at the conclusion of the academic year. Retention data were considered by way of Fall 2009 registration at the conclusion of the university's drop/add period. This information was provided by the university's office of Institutional Research.

The academic advising unit participating in the study collected data throughout the academic year as well. Inherent in the responsibilities of academic advising is the task of maintaining detailed notes of contacts with students. An academic advising database, a proprietary web-based system, is in use through advising units at the university. The advising database not only allows freeform notes, but also enables contacts with students to be categorized both by the purpose and type of communication. Additionally, the advising database has a reports function that allows for the extraction of comprehensive information on levels of activity within the advising centers.

In order to provide evidence to establish that the intervention was provided as envisioned and represents a unique effort within the university, analyses of advising contacts for the 2008-09 academic year were conducted on the participating advising center and comparable advising units. Of the thirteen schools and colleges admitting freshmen at the university, four advising units were selected as comparison groups in the analysis as presented in Table 3. The main criterion for selection was analogous size of the admitted freshmen class. The size of the incoming 2008-09 freshmen class among the top five advising units (including the participant) ranged between 514 and 798, while the excluded units varied between nine and 274 incoming freshmen). The participating advising center is distinct from the other units due to a declaration of major policy at the university, as it serves a greatly reduced number of upperclassmen and does not advise students through to the point of graduation. Analysis of advising activity will take into account the differential size of units by averaging the number of advising contacts with respective undergraduate student populations. An additional analysis will consider the specific appointment types that relate directly to the intervention. Specifically, the appointment types of "probation counseling" and "problem (course/instructor/personal)" will be compared, as the several of the intervention activities (e.g., review of mid-semester progress reports; outreach for the academic warning and probation program) related most directly to these two appointment types and were logged in the academic advising database as such.

Table 3.

2008-09 Undergraduate Student Population of Participating and Comparison Advising Centers

Advising Unit	Admitted Freshmen	Total Undergraduate Students	Freshmen	Sophomores	Juniors	Seniors
Participant	697	1,576	1,024	503	47	2
C1	514	3,630	826	901	911	992
C2	576	4,467	915	987	1,190	1,375
C3	667	5,598	1,141	1,257	1,503	1,697
C4	798	3,252	1,182	780	633	657

Note: C1 through C4 represent the four comparable advising centers.

Another feature of the academic advising database is the session report, a synopsis of the communication between the academic advisor and the student that is sent electronically to the student's online account, becoming a permanent record to which a student can refer. Random audits of the advising database notes were completed in order to make certain that the intervention protocols were being followed.

In addition to the utilization of the academic advising database, a separate Excel file was maintained for the purpose of collecting data for the study. The academic advisors were required to indicate with which students they had met, verify that the initial conversation had been held, and document any remarks made by participants during the course of the intervention that they deemed noteworthy (i.e., responses that would not be part of standard advising session report, but may be of benefit to the researcher). After each new student orientation session, the file was checked to ensure that all study participants were accounted for and had their initial conversation with a trained academic advisor. The spreadsheet also contained a log of contacts made with participants per the intervention (i.e., mid-semester progress and final examination correspondence). Additional first-year retention data was maintained by the advising unit, which included notes pertaining to the reason for departure (when available). In the analysis, participant remarks made during the initial contact were grouped based on thematic similarities (ex. "Did not work hard for grades in high school" and "self-reported 'slacker' in high school") and further categorized based on their relationship to variables in the prediction equation, when applicable (ex. Item 74, "Most of my teachers considered me one of the harder workers in their class"). The remarks were coded as either potentially supportive of achievement, a hindrance to academic performance, or unknown with regard to impact based upon the factors identified in the risk prediction equation.

For Phase One of the study, the risk prediction equation was assessed by correlating first-semester predicted GPA with actual first-semester GPA of entering freshmen in the 2008-09 cohort. Mean differences between predicted and actual GPA were computed to explore how accurately the equation predicted at each risk level. Students in all ten risks levels were considered in the analysis; however, students in the participating academic division were excluded from the analysis, as a subset (risk levels 1 and 2) received the intervention. Additionally, the variables that contributed to the risk equation were assessed for continued predictive validity of first-semester GPA using stepwise multiple regression, both with the full range of risk levels and levels 1 and 2 only. The purpose of these analyses will be to assess the use of the risk prediction equation with a broad range of applications as well as an early warning system for students most academically at-risk.

The intervention was evaluated by comparing the performance of risk level 1 and 2 students in the academic division participating in the study with the performance of those students in comparable risk categories throughout the institution who did not receive the intervention. Academic performance was evaluated for both the Fall 2008 and Spring 2009 semesters. The comparison was made utilizing a 2x2 Factorial ANOVA, with risk level and intervention participation as the two factors. Moreover, mean differences between predicted and actual Fall 2008 GPA as well as Fall 2008 and Spring 2009 GPA were compared in order to evaluate whether academic performance was in accordance with expectations and further explore the potential impact of the intervention. Retention rates were compared of those students receiving the intervention and those who did not. The anonymity of the data was maintained, as identifiers were removed prior to the analysis of the data, and no personal information is reported.

Ethical Considerations

Participants in the study remained unaware of their categorization as potentially at-risk for low academic performance. The decision was made to keep the participants blind to their status during the pilot year of intervention, as the main goals of the study were to a) validate the prediction equation and b) determine if an appropriate and valid intervention could be developed and implemented. No advising and support services were withheld from this subset of at-risk students; instead, participants received additional assistance within the context of advising services. As such, it was deemed that suppressing the categorization of the participants would cause no harm to their academic progress and could possibly enhance their opportunity for success. Keeping the participants blind to their categorization offered a control for an observer (a.k.a. Hawthorne) effect, a threat to both internal and external validity of the study. Specifically, the participants could have sought to improve their academic performance based on the knowledge they were being observed rather than as a result of the intervention, and generalizability of the findings would be diminished.

A secondary consideration took into account the incoming students within the academic division who were not selected as participants in the study. First semester students who were not labeled as “at-risk” were not eligible to receive the additional advising services from which they conceivably could have benefited. However, this subgroup received the traditional range of advising services provided to incoming freshmen within the academic division, as the research project did not impede the delivery of conventional services.

CHAPTER 4

RESULTS

The results of the analyses are presented in two main sections according to each phase of the study. The results in Phase One address the first research question: does the risk prediction equation developed by using characteristics of the 2007-08 cohort of freshmen indeed predict academic performance of the 2008-09 cohort of freshmen? The results presented in Phase Two concern the efficacy of the intervention implemented with those students who were identified as academically at-risk.

Phase One

In order to establish the validity of the risk prediction equation, measures of academic performance were considered in the analysis. Of central interest was Fall 2008 GPA, as the risk prediction equation was developed as a predictor of first-semester performance. An additional variable of interest was one-year retention to the Fall 2009 semester. Considered for analysis were all incoming freshmen in the 2008-09 cohort to which the equation was applied and associate levels of risk were attributed (n=4,222). Excluded from the analysis were a subset of students who were admitted to the institution, but did not attend for the Fall 2008 semester (n=94) or withdrew from the Fall 2008 semester before its conclusion (n=21), as these students did not earn a first-semester GPA. Also excluded were the subset of students who were treated with the risk intervention in the participating academic unit (n=106) and special admission students (n=252), as involvement could have impacted first-semester academic performance [Note: student-athlete categorization was not made available in the data set utilized for Phase One analysis; therefore, this subgroup could not be filtered out]. Table 4 presents the risk

Table 4.

Risk Categorization, Predicted GPA and Fall 2008 GPA of 2008-09 Entering Freshmen

Risk Level	Predicted GPA	Fall 2008 GPA	*n*	*SD*	*n* retained Fall 2009	% retained Fall 2009
1	2.17	2.24	201	.87	160	79.60
2	2.43	2.42	279	.88	235	84.23
3	2.56	2.59	351	.77	296	84.33
4	2.66	2.64	353	.82	303	85.84
5	2.76	2.81	396	.66	344	86.87
6	2.86	2.89	373	.70	326	87.40
7	2.96	3.01	425	.66	380	89.41
8	3.07	3.14	421	.61	382	90.74
9	3.23	3.29	481	.59	446	92.72
10	3.53	3.55	472	.43	438	92.80
Total	2.90	2.94	3,752	.78	3,310	88.22

categorization, predicted first-semester GPA, actual first-semester GPA, and one-year retention data for the 2008-09 cohort.

A Pearson correlation was computed between predicted GPA and actual Fall 2008 GPA, and a significant, modest positive correlation was found (r=.48, p<.001). In order to examine the accuracy of prediction at each risk level, the mean difference between actual and predicted GPA was computed as presented in Table 5. The prediction equation slightly under-predicted actual GPA overall and at most risk levels, excluding students at risk level 4 for whom the equation slightly over-predicted and risk level 2 for whom there was no mean difference between predicted and actual GPA in the first semester.

In order to further explore whether the variables utilized in the risk equation were valid predictors of first-semester GPA in the 2008-09 cohort, Pearson correlations were computed for each of the variables as shown in Table 6. Among the twenty-one variables, sixteen were found to be significantly correlated with Fall 2008 GPA. These variables included cognitive measures such as high school GPA (both actual and self-reported), SAT-Writing score, and elements of the English and Mathematics placement exams. Among the cognitive variables, the strongest relationship was found between actual high school GPA and Fall 2008 GPA (r=.40, p<.001). Two motivational variables were found to be significantly, although weakly, correlated with Fall 2008 GPA, Items 74 (r = .23, p < .001) and Item 80 (r = .17, p < .001). Additionally, two separate items related to work plans yielded significant, weak correlations with Fall 2008 GPA, Item 5 (r = .10, p < .001) and Item 62 (r = -.09, p < .001).

Table 5.

Mean Differences Between Predicted and Actual Fall 2008 GPA by Risk Level

Risk Level	*n*	Mean Difference	*SD*
1	201	-0.08	.85
2	279	0.00	.88
3	351	-0.03	.77
4	353	0.02	.82
5	396	-0.05	.65
6	373	-0.03	.71
7	425	-0.05	.66
8	421	-0.07	.61
9	481	-0.06	.58
10	472	-0.02	.42
Total	3,752	-0.04	.68

Table 6.

Pearson Correlations of Prediction Equation Variables with Fall 2008 GPA[a]

Variable	r
HGPA: High School GPA	.40††
SATW: SAT-Writing	.23††
NSQ: New Student Questionnaire composite score	.38††
I17: What was your approximate high school average	.36††
I5: During the school year, on the average, how many hours do you plan to work (for money) per week	.10††
COL: College affiliation	.11††
MATH3: Math placement section 3	.19††
I74: Most of my teachers considered me one of the harder workers in their class	.23††
I59: What is the chance that you will change your major field of study while you are at the university	-.01
READ: English placement reading score	.19††
I80: I am organized and have good study habits.	.17††
I78: I am self confident.	-.02
I62: What is the chance that you will work full time while attending college	-.09††
I31: During high school (grades 9-12), how much did you like the Natural Sciences	-.01
I67: What is the chance that you will work with a professor on a research project while at the university	.01

Table 6. (continued)

Variable	r
I57: How important was meeting students with backgrounds and interests different from yours in your decision to come here	.01
I34: How important was wanting to get away from home in your decision to go to	-.03†
I36: How important wanting to learn more about things that interest you in your decision to go to college	.05††
I29: During high school (grades 9-12), how much did you like Mathematics	-.01
MATH1: Math placement section 1	.16††

$^{a}N = 3{,}752$. $^{\dagger}p<.01$, one-tailed. $^{\dagger\dagger}p<.001$, one-tailed.

In order to further explore the relationship of variables in the risk prediction equation to Fall 2008 GPA, a stepwise multiple regression was conducted and a significant model emerged [$F(15, 3736)=80.10$, $p < .001$, Adjusted R square = .240]. As presented in Tables 7 and 8, the analysis revealed high school GPA as the strongest predictor of Fall 2008 GPA, which alone counted for 16.1% of the variance. After adding the New Student Questionnaire composite score and SAT-Writing, 21.3% of variance in Fall 2008 GPA was explained. While additional, significant adjustments in R Square were found with the addition of each variable in the model, only a slight increase in explained variance was noted.

Variables from the original risk prediction equation that were not included in the model were Item 36 (“How important wanting to learn more about things that interest you in your decision to go to college”), Item 57 (“How important was meeting students with backgrounds and interests different from yours in your decision to come here"), Item 59 ("What is the chance that you will change your major field of study while you are at the university"), Item 67 ("What is the chance that you will work with a professor on a research project while at the university"), and Item 78 ("I am self confident"). The findings suggest that while support was found for the predictive ability of the original risk equation, not all variables continued to carry predictive power when applied to the new cohort of students.

Table 7.

Stepwise Multiple Regression of Predictors of Fall 2008 GPA[a]

Model	*R*	Adjusted *R* Square
1. HGPA	.401	.161
2. HGPA, NSQ	.447	.199
3. HGPA, NSQ, SATW	.463	.213
4. HGPA, NSQ, SATW, COL	.468	.218
5. HGPA, NSQ, SATW, COL, MATH3	.473	.222
6. HGPA, NSQ, SATW, COL, MATH3, I62	.477	.226
7. HGPA, NSQ, SATW, COL, MATH3, I62, I17	.481	.230
8. HGPA, NSQ, SATW, COL, MATH3, I62, I17, READ	.483	.232
9. HGPA, NSQ, SATW, COL, MATH3, I62, I17, READ, I80	.486	.234
10. HGPA, NSQ, SATW, COL, MATH3, I62, I17, READ, I80, I31	.488	.236
11. HGPA, NSQ, SATW, COL, MATH3, I62, I17, READ, I80, I31, I05	.489	.237
12. HGPA, NSQ, SATW, COL, MATH3, I62, I17, READ, I80, I31, I05, I34	.490	.238
13. HGPA, NSQ, SATW, COL, MATH3, I62, I17, READ, I80, I31, I05, I34, I29	.491	.239
14. HGPA, NSQ, SATW, COL, MATH3, I62, I17, READ, I80, I31, I05, I34, I29, I74	.492	.239

Table 7. (continued)

Model	R	Adjusted R Square
15. HGPA, NSQ, SATW, COL, MATH3, I62, I17, READ, I80, I31, I05, I34, I29, I74, MATH1	.493	.240

[a]N=3,752

Note: The variables above are coded as follows: HGPA=High school GPA; NSQ=New Student Questionnaire composite score; SATW= SAT-Writing; COL=College affiliation; MATH3=Math placement section 3; I62= What is the chance that you will work full time while attending college; I17= What was your approximate high school average; READ= English placement reading score; I80= I am organized and have good study habits; I31= During high school (grades 9-12), how much did you like the Natural Sciences; I05= During the school year, on the average, how many hours do you plan to work (for money) per week; I34= How important was wanting to get away from home in your decision to go to college; I29= During high school (grades 9-12), how much did you like Mathematics; I74= Most of my teachers considered me one of the harder workers in their class; MATH=Math placement section 1

Table 8.

Stepwise Multiple Regression Model Summary of Predictors of Fall 2008 GPA[a]

Model Summary	R	Adjusted R Square	Beta
HGPA: High School GPA			.380
NSQ: New Student Questionnaire composite score			.073
SATW: SAT-Writing			.001
COL: College affiliation			.519
MATH3: Math placement section 3			.019
I62: What is the chance that you will work full time while attending college			-.054
I17: What was your approximate high school average			.076
READ: English placement reading score	.493	.240	.010
I80: I am organized and have good study habits			.038
I31: During high school (grades 9-12), how much did you like the Natural Sciences			-.033
I05: During the school year, on the average, how many hours do you plan to work (for money) per week			.034
I34: How important was wanting to get away from home in your decision to go to college			-.035

Table 8. (continued)

Model Summary	R	Adjusted R Square	Beta
I29: During high school (grades 9-12), how much did you like Mathematics			-.027
I74: Most of my teachers considered me one of the harder workers in their class			.035
MATH1: Math placement section 1			.012

[a]N=3,752

To further explore the application of the prediction equation in an early warning system, the prior analyses were conducted using Risk level 1 and 2 students only (excluding the treated group and special admission program participants). Table 9 presents the results of Pearson correlations of the prediction equation variables with Fall 2008 GPA. Among the twenty-one variables, only six were found to have significant weak correlations with Fall 2008 GPA among the Risk Level 1 and 2 students: High School GPA and self-reported high school GPA (Item 17), New Student Questionnaire composite score, college affiliation, Item 59 (What is the chance that you will change your major field of study while you are at the university), and Item 80 (I am organized and have good study habits).

Table 9.

Risk Level 1 and 2 Pearson Correlations of Prediction Equation Variables with Fall 2008 GPA[a]

Variable	*r*
HGPA: High School GPA	.14††
SATW: SAT-Writing	-.03
NSQ: New Student Questionnaire composite score	.13†
I17: What was your approximate high school average	.09†
I5: During the school year, on the average, how many hours do you plan to work (for money) per week	-.03
COL: College affiliation	.08†
MATH3: Math placement section 3	.01
I74: Most of my teachers considered me one of the harder workers in their class	.03
I59: What is the chance that you will change your major field of study while you are at the university	-.12††
READ: English placement reading score	.05
I80: I am organized and have good study habits.	.08†
I78: I am self confident.	.06
I62: What is the chance that you will work full time while attending college	-.04
I31: During high school (grades 9-12), how much did you like the Natural Sciences	.05
I67: What is the chance that you will work with a professor on a research project while	.03
I57: How important was meeting students with backgrounds and interests different	.03

Table 9. (continued)

Variable	*r*
I34: How important was wanting to get away from home in your decision to go to	.00
I36: How important wanting to learn more about things that interest you in your decision to go to college	.05
I29: During high school (grades 9-12), how much did you like Mathematics	.03
MATH1: Math placement section 1	.01

[a]*N*=480. †*p*<.05, one-tailed. †† *p*<.01, one-tailed.

A stepwise multiple regression was conducted and a significant model emerged [$F(3, 476)=6.64$, $p < 0.001$, Adjusted R square = .036], the results of which are shown in Table 10. While the model was significant, range restriction of Fall 2008 GPA could be a factor when utilizing multiple regression with Risk Level 1 and 2 students only.

Table 10.

Risk Level 1 and 2 Stepwise Multiple Regression of Predictors of Fall 2008 GPA[a]

Model Summary	*R*	Adjusted *R* Square	Beta
NSQ=New Student Questionnaire composite score			.126
HGPA= High School GPA	.204	.036	.120
COL=College affiliation			.100

[a]*N*=480

The overall findings in Phase One suggest that while modest support was found for the predictive ability of the original risk equation, more effective models should be sought, particularly for the subset of students who are most academically at-risk. Additionally, the results offer modest support for the inclusion of non-cognitive variables when predicting first-semester academic performance. The variables differ, however, when risk level is taken into consideration.

Phase Two

Outcomes presented for the second phase of the study include: the examination of the fidelity of the intervention; analysis of participant remarks during the initial contact with participants; and analysis of 2008-09 academic performance and Fall 2009 retention data for the participants and comparison group. To illustrate the administration of the risk intervention, Figure 1 depicts the selection of participants and progression through the stages of the program.

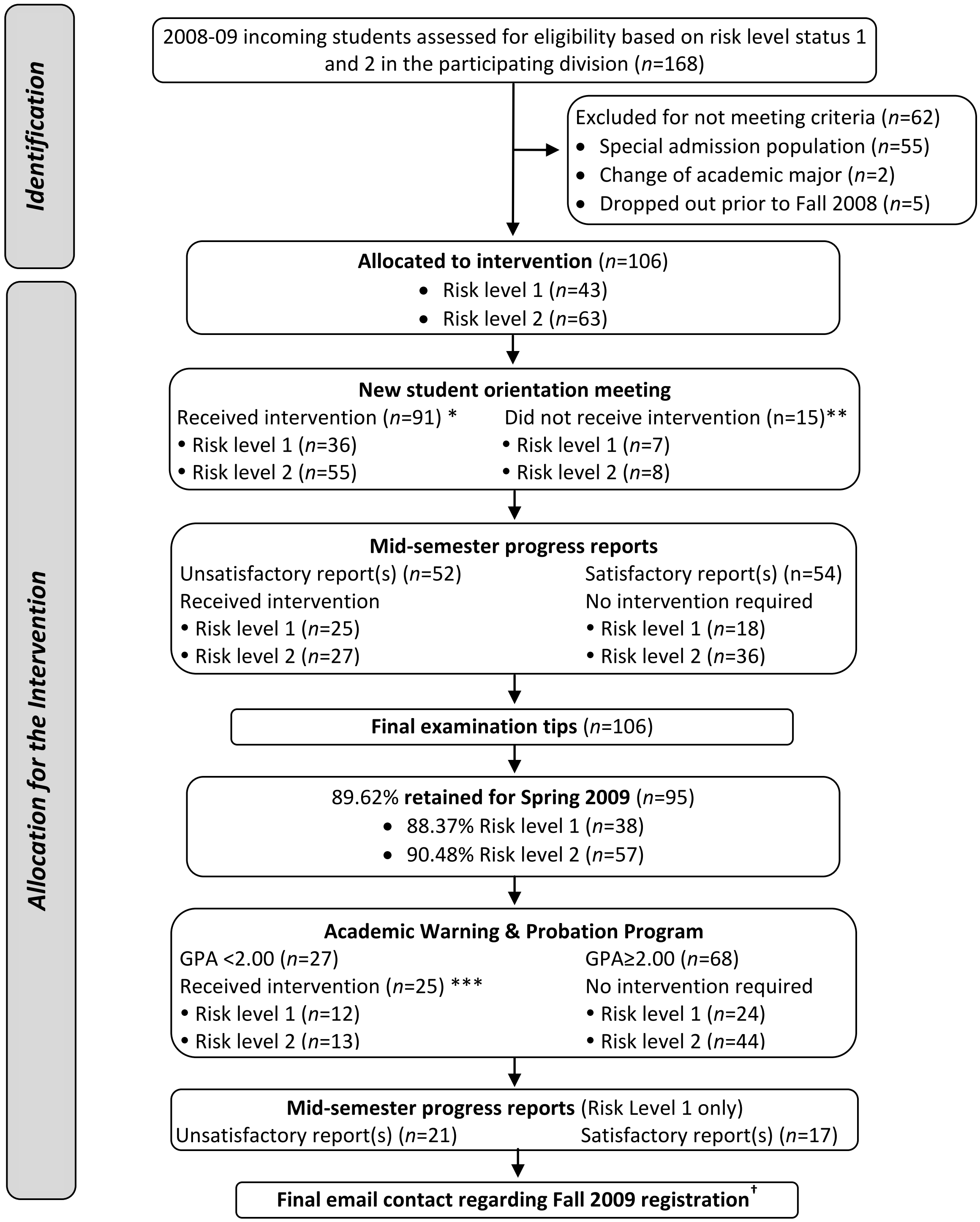

Figure 2. Flow diagram depicting the progression through the stages of the risk intervention.

Note. * Classification of nineteen students was not provided prior to orientation; twelve were reached by phone. **Includes seven students who could not reached by phone, and eight students who were not identified until after orientation. ***Two students did not receive the intervention: one student did not appear on academic warning list, while one inadvertently overlooked. †Counts are not available, as final contact records were not maintained.

Analysis of the Intervention

In order to establish that the intervention was provided as envisioned and represents a unique effort on the part of the participating advising unit, an analysis of advising contacts for the 2008-09 academic year was conducted. Table11 presents the total number of advising contacts that were logged in the academic advising database as well as the average number of advising contacts per undergraduate student for the participating and comparison units.

Table 11.

2008-09 Annual Advising Activity of Participating and Comparison Advising Centers

Advising Unit	Undergraduate Students	Total Number of Advising Contacts	Average Number of Contacts per Student
Participant	1,576	10,182	6.46
C1	3,630	10,735	2.96
C2	4,467	19,255	4.31
C3	5,598	15,071	2.69
C4	3,252	10,540	3.24

Note: C1 through C4 represent the four comparable advising centers.

The average number of contacts per student for participating advising center was 1.50 times higher than the next highest comparison group (C2), 1.99 times higher than C4, and over twice as high as both C1 and C3. Monthly activity was computed for the participating advising center and comparison units by averaging the total number of contacts and undergraduate students (see Figure 3). The participating unit maintained the highest level of activity among the advising centers for all but one month of the academic year (i.e., February 2009). Particularly high peaks in advising activity for the participating unit can be noted during certain months in which features of the intervention were implemented. For example, mid-semester progress report contacts were sent during October 2008 and March 2009, while January 2009 includes contacts for the Academic Warning and Probation program.

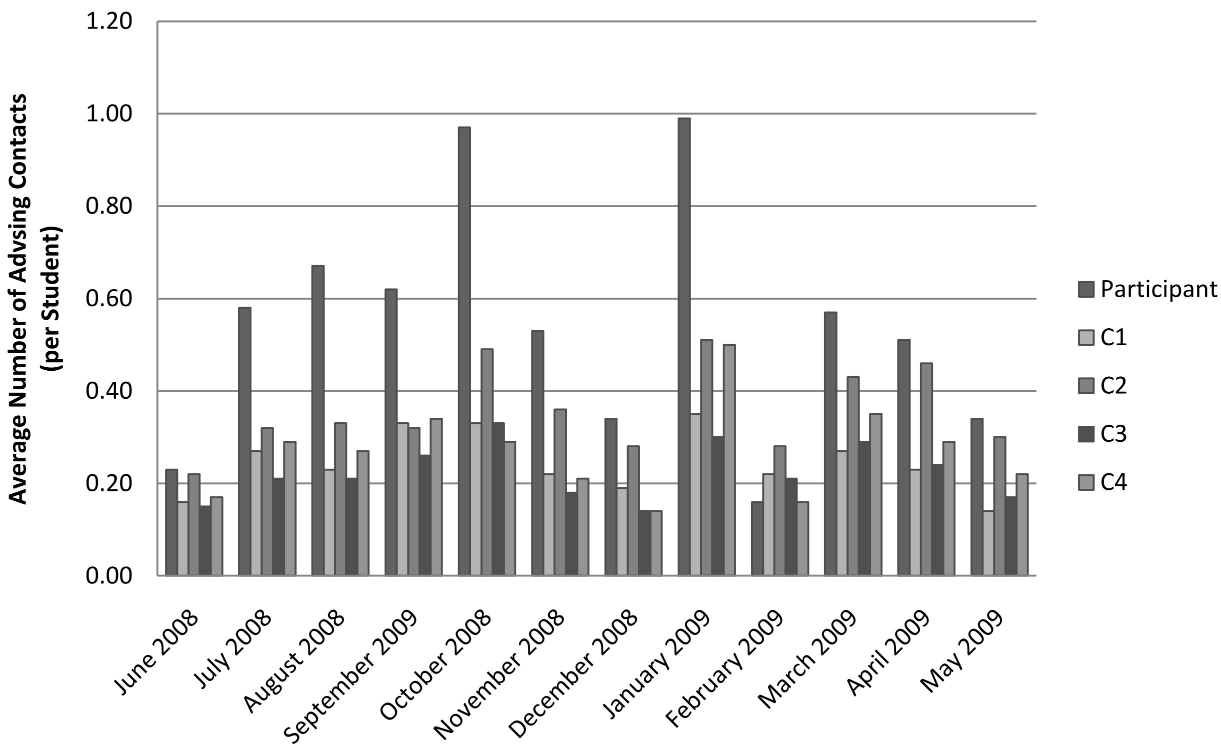

Figure 3. Average number of advising contacts per month for the 2008-09 academic year for participating advising center and comparison units.

In addition to the aggregate contacts reported for each advising center, two appointment types were considered in the analysis. Specifically, annual totals of “probation counseling” and "problem (course/instructor/personal)" types were tallied for the participating and comparison units (see Figure 4). In terms of the "probation counseling" appointment type, the participating advising unit logged 311 contacts for the 2008-09 academic year, over three times as many contacts as the next highest unit (C3=98). The participating unit recorded 195 "problem (course/instructor/personal)" contacts, 1.23 times more than the next highest unit (C3=159).

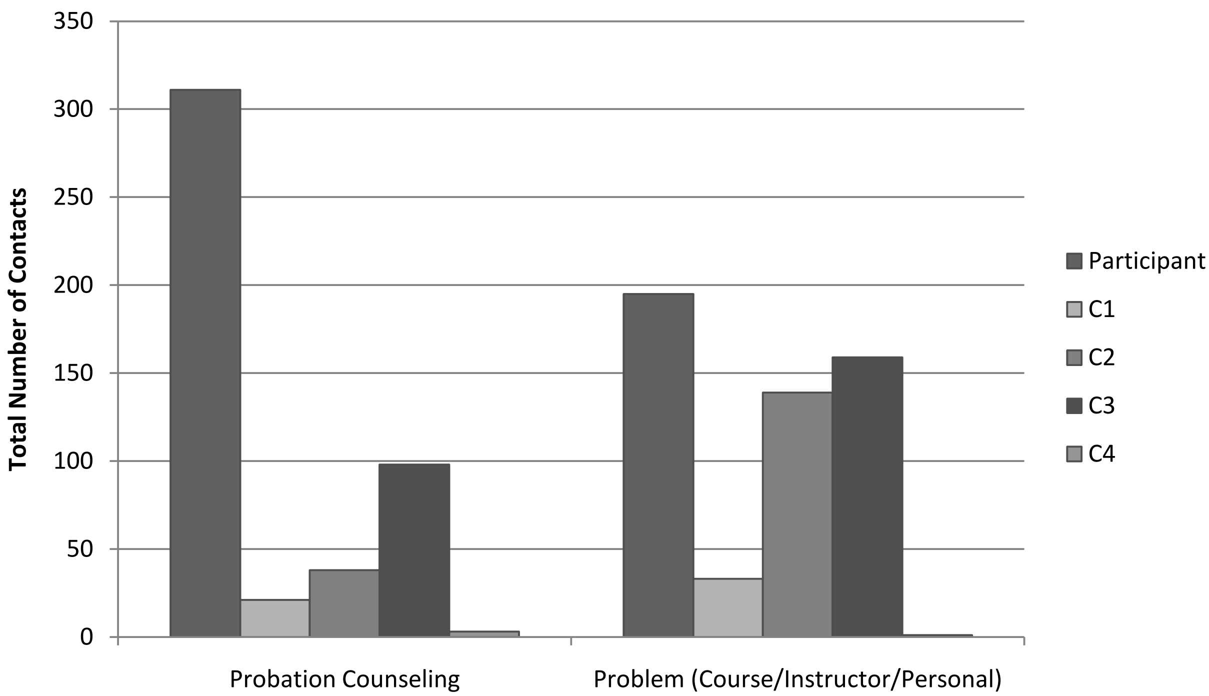

Figure 4. Appointment type totals for the 2008-09 academic year for participating advising center and comparison units.

Analysis of New Student Orientation Remarks

The supplemental advising notes made by academic advisors during new student orientation (the first point of contact with participants) were reviewed, and the remarks of 78 participants were tallied and coded for analysis. Table 12 presents the remarks delineated by risk level and indicated for potential impact on academic performance. Among the twenty-five distinct remark categories noted, “Did not work hard for grades in high school” received the highest percentage of responses (28.21%, *n*=22). The next highest number of responses was for “Lacks study skills and time management” (21.79%, *n*=17). Additional notable items were “Likes Math and/or Science” (20.51%, *n*=16), “Plans to work < 20 hours per week” (17.95%, *n*=14), “Struggled with Math and/or Science” (15.38%, *n*=12), and “Struggled with subjects other than Math and/or Science” (15.38%, *n*=12).

Within certain items, distinct nuances of responses were noted. Specifically, the remarks categorized as “Did not work hard for grades in high school” contained several sub-responses: three of the participants used the term “slacker” to describe themselves; two reported that grades came easily to them; two stated that they did not work hard in their junior and senior year; and two reported not working hard until their junior and senior years of high school. Among the self-reported time-management issues, five participants labeled themselves as “procrastinators,” and one as a “recovering procrastinator”.

When considering the pattern of responses of positive remarks, a distinction between risk levels was noted. Notably, over three times as many positive remarks were made by Risk level 2 (*n*=31) than Risk level 1 participants (*n*=9), which was a disproportionately high rate (67.39% versus 28.13% respectively). Concomitantly, a higher proportion of negative remarks were made by Risk level 1 participants (68.75%) than Risk level 2 participants (56.52%). Another notable difference was found with “Excited to start college,” with 13.04% of Risk level 2 participants making this remark as compared with 3.13% of Risk Level 1 respondents.

Table 12.

Remarks Noted During Initial Contact with Participants

Remark (and Corresponding NSQ Item)	Risk Level 1 (*n*=32)		Risk Level 2 (*n*=46)		Total (*N*=78)	
	n	%	*n*	%	*n*	%
Worked hard for grades in high school (Item 74)[a]	2	6.25	6	13.04	8	10.26
Likes Math and/or Science (Items 29 and 31)[a]	5	15.63	11	23.91	16	20.51
Reports a plan to study and manage time (Item 80)[a]	0	0.00	2	4.35	2	2.56
Plans to work < 20 hours per week (Item 5)[a]	2	6.25	12	26.09	14	17.95
Did not work hard for grades in high school (Item 74)[b]	10	31.25	12	26.09	22	28.21
Does not like Math and/or Science (Items 29 and 31)[b]	3	9.38	4	8.70	7	8.97
Lacks study skills & time management (Item 80)[b]	8	25.00	9	19.57	17	21.79
Low self-confidence (Item 78)[b]	0	0.00	1	2.17	1	1.28
Plans to work > 20 hours per week (Item 5)[b]	1	3.13	0	0.00	1	1.28
Attended boarding school[c]	1	3.13	1	2.17	2	2.56
Avoiding morning classes/waking up early [c]	2	6.25	1	2.17	3	3.85
Concerned about class discussions[c]	1	3.13	0	0.00	1	1.28
Concerned about commuting[c]	1	3.13	2	4.35	3	3.85
Concerned about finding classroom buildings[c]	1	3.13	0	0.00	1	1.28
Concerned about living on campus[c]	0	0.00	1	2.17	1	1.28
English as a Second Language[c]	2	6.25	1	2.17	3	3.85
Excited to live on campus[c]	2	6.25	2	4.35	4	5.13
Excited to start college[c]	1	3.13	6	13.04	7	8.97
Liked subjects other than Math/Science[c]	3	9.38	1	2.17	4	5.13
Poor attendance in high school[c]	1	3.13	2	4.35	3	3.85
Reported disability (learning and/or physical) [c]	1	3.13	1	2.17	2	2.56
Struggled with Math and/or Science[c]	6	18.75	6	13.04	12	15.38
Struggled with subjects other than Math/ Science[c]	5	15.63	7	15.22	12	15.38
Will be commuting[c]	3	9.38	5	10.87	8	10.26
Worked hard in some subjects, not others[c]	3	9.38	2	4.35	5	6.41

[a] Supports academic performance per risk equation. [b] Impedes academic performance per risk equation.

[c]Not directly related to New Student Questionnaire item.

A follow-up analysis was conducted to compare the responses of the treatment group by risk level to the corresponding New Student Questionnaire items, and mean responses are presented in Table 13. A one-way analysis of variance revealed no significance difference between Risk level 1 and 2 mean responses to the items. Therefore, while distinctions were noted among the verbal remarks made by the subset of participants, differences among the full set of questionnaire responses were not statistically significant.

Table 13.

Mean Responses to New Student Questionnaire Items that Correspond with Remarks

	Risk Level 1 (*n*=41)		Risk Level 2 (*n*=65)	
New Student Questionnaire Item	*M*	*SD*	*M*	*SD*
Item 5: During the school year, on the average, how many hours do you plan to work (for money) per week	2.27	.98	2.55	.73
Item 29: During high school (grades 9-12), how much did you like Mathematics	2.54	1.36	2.26	1.27
Item 31: During high school (grades 9-12), how much did you like Natural Sciences	2.76	1.11	2.69	1.13
Item 74: Most of my teachers considered me one of the harder workers in their class.	2.12	1.14	2.42	1.14
Item 78: I am self confident.	3.07	1.01	3.14	.93
Item 80: I am organized and have good study habits.	1.88	1.00	2.12	1.02

N=106

Academic Performance Analysis

Analysis of the 2008-09 academic performance of the intervention participants will take into consideration Fall 2008 GPA, Spring 2009 GPA, and Fall 2009 retention. Table 14 presents risk categorizations, predicted first-semester GPA and actual performance of participants and the comparison group during the academic year.

Table 14.

Risk Level 1 and 2 Predicted GPA, Fall 2008 and Spring 2009 GPA, and Fall 2009 Retention

Risk	Predicted	Fall 2008			Spring 2009			% retained
Level	GPA	GPA	*n*	*SD*	GPA	*n*	*SD*	Fall 2009
				Participants				
1	2.20	2.21	43	.99	2.22	38	1.02	65.12[a]
2	2.44	2.44	63	.93	2.47	57	1.02	92.06[b]
Total	2.34	2.35	106	.96	2.37	95	1.03	81.13[c]
				Comparison Group				
1	2.17	2.27	173	.88	2.33	161	.87	77.14[d]
2	2.43	2.45	254	.90	2.48	243	.90	82.17[e]
Total	2.32	2.38	427	.89	2.42	404	.89	80.14[f]

[a]n=28. [b]n=58. [c]n=86. [d]n=135. [e]n=212. [f]n= 347.

In order to examine the accuracy of prediction for participants and the comparison group at each risk level, the mean difference between actual and predicted GPA was computed. Predicted GPA of participants very slightly under-predicted performance at both Risk level 1 ($M = {}^{-}0.01$, $SD = 0.99$) and Risk level 2 ($M = {}^{-}0.01$, $SD = 0.93$). Predicted GPA for the comparison group under-predicted Risk level 1 (M = $^{-}$0.10, SD = 0.88) while slightly under-predicting at Risk level 2 (M= $^{-}$0.02, SD=0.90). An analysis of variance revealed no significance difference between the main effects for risk level [$F(1,529) = 0.17$, $p>.05$] or intervention participation [$F(1,529) = 0.24$, $p>.05$], nor the interaction between risk level and intervention [$F(1,529) = 0.13$, $p>.05$] when considering Predicted and Actual Fall 2008 mean differences.

Fall 2008 GPA

The first-semester performance of Risk level 1 and 2 students from throughout the institution was considered in the analysis. The Fall 2008 GPA of intervention participants was compared with students outside of the participating unit, excluding those students who were among the special admission populations. Table 15 presents the means for Fall 2008 GPA by risk level and treatment.

Table 15.

Risk Level 1 and 2 Fall 2008 GPA by Intervention Participation

	Mean			Standard Deviation			*N*		
Risk Level	Treated	Not Treated	Total	Treated	Not Treated	Total	Treated	Not Treated	Total
1	2.21	2.27	2.26	.99	.88	.90	43	173	216
2	2.44	2.45	2.45	.93	.90	.90	63	254	317
Total	2.35	2.38	2.37	.96	.89	.91	106	427	533

A 2x2 Factorial ANOVA was conducted with risk level (1 and 2) and intervention participation (treated and not treated) as the two factors (see Table 16). Levene's Test of Equality of Error Variances was used to establish homogeneity of variance, and the result was non-significant [$F(3, 529) = 0.54$, $p > .05$].

Table 16.

ANOVA Summary Table for Fall 2008 GPA by Risk Level and Intervention Participation

SOURCE	*df*	*SS*	*MS*	*F*
Risk Level	1	3.39	3.39	4.15*
Intervention	1	.11	.11	.13
R X I	1	.08	.08	.10
Error	529	431.75	.82	
Total	533	3433.17		

*$p < .05$

The two-factor analysis of variance revealed no significant main effect for treatment, $F(1, 529) = 0.13$ $p > .05$, nor a significant interaction between treatment and risk level, $F(1, 529) = 0.10$, $p > .05$; however, a significant main effect was revealed for risk level, $F(1,529) = 4.15$, $p < .05$. The results indicate that Risk level 2 students earned a significantly higher Fall 2008 GPA than Risk level 1 students. There were no other significant differences found among the remaining comparisons.

Spring 2009 GPA

In order to continue the evaluation of the effectiveness of the intervention, academic performance in the spring semester was considered in the analysis. The Spring 2009 GPA of intervention participants was compared with students outside of the participating unit, once again excluding those students who were among the special admission populations. Table 17 presents the means for Spring 2009 GPA by risk level and treatment.

Table 17.

Risk Level 1 and 2 Spring 2009 GPA by Intervention Participation

	Mean			Standard Deviation			*N*		
Risk Level	Treated	Not Treated	Total	Treated	Not Treated	Total	Treated	Not Treated	Total
1	2.22	2.33	2.31	1.02	.87	.90	38	161	199
2	2.47	2.48	2.48	1.02	.90	.93	57	243	300
Total	2.37	2.42	2.41	1.03	.89	.92	95	404	499

A 2x2 Factorial ANOVA was conducted with risk level (1 and 2) and intervention participation (treated and not treated) as the two factors. Levene's Test of Equality of Error Variances was used to establish homogeneity of variance, and the result was non-significant [$F(3, 495) = 1.05$, $p > .05$]. As presented in Table 18, the two-factor analysis of variance revealed no significant main effects for treatment or risk level, nor a significant interaction between treatment and risk level.

Table 18.

ANOVA Summary Table for Spring 2009 GPA by Risk Level and Intervention Participation[a]

SOURCE	*df*	*SS*	*MS*	*F*
Risk Level	1	2.99	2.99	3.55
Intervention	1	.28	.28	.33
R X I	1	.18	.18	.21
Error	495	431.75	.84	
Total	499	3433.17		

[a]N=499.

In order to explore the impact of participation in the academic warning and probation program, the Spring 2009 GPA of participants was considered (see Table 19). Since only students who did not meet the minimum university standard of 2.00 were required to participate in the program (n=25), the utilization of mean Spring 2009 GPA in the comparison would not yield an equitable analysis of second semester performance. Using first-semester performance as the predictor of second-semester performance, the mean difference between Fall 2008 and Spring 2009 GPA was calculated for the study participants. The mean difference for the academic warning and probation program participants was $^{-}$.17 (n=25, SD=0.55), while the difference for those who did not participate in the program was .18 (n=70, SD=0.67). A two-tailed independent samples t-test revealed a significant difference, $t(93) = 2.33$, $p<.05$. The results indicate that the academic warning and probation program participants earned a significantly higher expected Spring 2009 GPA than those who did not participate in the program.

Table 19.

Spring 2009 GPA by Academic Warning and Probation Program Participation

	Mean			Standard Deviation			*N*		
Risk Level	Treated	Not Treated	Total	Treated	Not Treated	Total	Treated	Not Treated	Total
1	1.46	2.61	2.22	.93	.84	1.02	13	25	38
2	1.41	2.75	2.47	.96	.85	1.02	12	45	57
Total	2.37	2.42	2.41	.93	.84	1.03	25	70	95

Fall 2009 Retention

The one-year retention rates of study participants were compared to the full cohort of Risk level 1 and 2 freshmen (excluding special admission program participants). Risk level 1 participants were retained at a rate of 65.12%, which was notably lower than the 79.60% retention of non-participant Risk Level 1 students. Conversely, Risk level 2 participants were retained at a higher rate (92.13%) than non-participants (84.23%). These finding suggest that the intervention had a disproportionate impact on study participants.

The results of the Phase Two analysis support the conclusion that the intervention represented a unique effort on the part of the participating advising center at the university. The findings also indicate that the intervention, as a whole, did not have an effect on the academic performance of the study participants. Very modest support was found for the impact of the academic warning and probation program on academic performance in the second semester specifically. The intervention may have provided a benefit to participants in Risk level 2, but did not assist Risk level 1 participants.

CHAPTER 5

DISCUSSION

Phase One

Modest support for the efficacy of the risk prediction equation was found through the analyses, which demonstrated that approximately 25% of variance in first-semester GPA could be explained by the predictor variables. Moreover, variables beyond the standard admissions criteria were found to be useful in predicting academic achievement of first-semester freshmen. While cognitive measures such as high school GPA, SAT scores and performance on placement examinations were part of the risk equation, non-cognitive variables added modest predictive value. In particular, motivational variables including dedication to academic pursuits and solid organizational skills and study habits were found to be related to the performance of the full cohort of freshmen. The results support previous research concerning aspects of academic self-efficacy and self-regulation (Barber et al., 2009; Chemers et al., 2001; Devonport & Lane, 2006; Lasane & Jones, 1999; Linnenbrink et al., 2002; Wolters, 2003). While dedication, organization and study habits can be considered to lie within the realm of motivation, they have also been deemed to be related to conscientiousness, a facet of personality (Furnham, Chamorro-Premuzic, & McDougall, 2003; Lounsbury et al., 2003; Newsome et al., 2000; Noftle & Robins, 2007; Wagerman & Funder, 2007).

In addition, two separate questionnaire items about work plans were found to be related to first-semester performance. These results are in keeping with prior research on the impact of work while participating in post-secondary education on a full-time basis (Astin, 1993). When considering academic performance, planning to work is not universally negative. Instead, the amount of hours per week and location of the job (on campus versus off campus) plays an important role. According to Astin (1993),

> Holding a part-time job off campus has a pattern of effects that is almost identical to the pattern associated with working full-time. Having a part-time job on campus, however, has a completely different pattern of effects. Holding a part-time job on campus is positively associated with attainment of a bachelor's degree and with virtually all areas of self-reported cognitive and affective growth. Working at a part-time job on campus also increases the student's chances of being elective to a student office, tutoring other students and attending recitals or concerts. It has positive effects on liberalism, leadership and commitment to the goals of promoting racial understanding and participating in programs to clear up the environment. (pg. 388)

Since the questionnaire utilized in the present study did not offer the opportunity to provide this additional level of detail regarding work plans, it could serve as a useful modification for future data collection and analysis.

When analyzing the efficacy of the risk prediction equation, distinctions were noted when it was analyzed using only the highest risk students (levels 1 and 2). Notably, many of the variables that factored into the risk equation were not significantly related to first-semester GPA in this subgroup. Instead, the potential of a change of major weighed in as an academic performance inhibitor, albeit weakly. These findings suggest that risk equations should be customized to the subpopulation of interest, rather than built on a full cohort of students, in order to provide the most effective prediction at each level. If the risk prediction is to be implemented as part of an early warning system, sensitivity to the most academically at-risk students is essential.

Phase Two

While the risk project was known to be a unique effort on the part of the participating unit, establishing the fidelity of the intervention through data analysis was still a primary concern. In reviewing the productivity of advising centers from across the university, the data demonstrated heightened activity in the participating unit, particularly during key points in the intervention. Analysis of the specific appointment types related to the intervention also demonstrated increased activity in the participating advising unit, particularly with regard to probation counseling prior to and during the spring semester. Although the intervention was designed with staffing limitations in mind, it was, for the most part, implemented as envisioned. One exception was noted during the spring mid-semester progress report contact, as the advising unit reached out to Risk level 1 participants only (as opposed to both risk levels as was the case in the prior semester). During the same contact, a positive adaptation was noted in the way of congratulatory messages for students with satisfactory ratings. Lastly, the lack of data retained on the final contact of the intervention did not allow for analysis of late registration activity and if this aspect of the intervention contributed to Fall 2009 retention.

The analysis of remarks made during the initial contact with the study participants yielded interesting results. While no comparisons could be made to students outside of the treatment group, patterns of responses were noted within the group. The findings support the efficacy of the risk classifications that result from the application of the equation, as the expectation would be that differences exist between risk levels. In particular, more positive remarks were made by Risk level 2 students than Risk level 1, and more negative remarks made by Risk level 1 participants than Risk level 2. The directionality of these differences is also in keeping with the risk levels. However, the analysis of the full set of New Student Questionnaire responses to the corresponding items yielded no significant difference. Therefore, the distinctions were noteworthy only among those students who provided verbal feedback in these areas. This finding illustrates the value of using multiple modes of survey, both written and oral, in the risk identification and intervention process. Moreover, the finding supports the importance of revealing to advising staff not only the risk classifications, but also the data that led to students' categorizations. For those participants who chose not to disclose personal attributes or experiences, the opportunity to engage in a deeper, more meaningful discussion about academic performance was lost.

In terms of first-semester performance, the intervention did not have an impact. In the spring, however, modest support was found for the positive effect of the academic warning and probation program on the students that were mandated to participate. In essence, the intervention experience differed substantially for the spring semester attendees, in that those who earned satisfactory GPA in the fall were not required to meet with an advisor at the onset of the spring. Therefore, an opportunity for a more personal, intrusive advising session was missed.

One of the most interesting comparisons was that of the one-year retention rate of Risk level 1 and 2 participants. For Risk level 1 participants, the retention rate was unusually low, which could suggest that the intervention actually discouraged the continuation of academic pursuits. Another possibility, however, is that the intervention offered the opportunity to assess interest in and ability to continue studies at the institution or post-secondary level entirely. Risk level 2 students, on the other hand, seemed to be assisted by the contract provided to them throughout the year. Since Risk level 2 students were not the most academically at-risk, they may have received the right amount of contact to support their efforts. In the absence of follow-up data, however, it is only possible to speculate why the retention rates.

Limitations of the Study

Phase One

With regard to the initial prediction phase of the study, a limitation existed with the development and application of the risk equation. Specifically, the risk equation was built on the prior year's cohort of freshmen and, thus, assumed the incoming class of freshmen was comparable along the continuum of variables utilized in the analysis. It is conceivable, however, that errors of omission or commission could result when determining risk factors in this manner. The class profile of admitted freshmen often change over time, and a notable shift in characteristics can render the risk classification less effective (or ineffective) unless anticipated and accounted for in the design of the equation. The findings supported this notion of a dynamic, shifting freshman class, as several of the original risk prediction variables were found to be ineffective in the revisited prediction model.

Due to limits imposed by the application of the intervention, it was not possible to independently evaluate the efficacy of the risk prediction equation in the participating academic unit. Since the unit housed primarily undeclared students, it is conceivable that the strength of prediction may differ for this subgroup of students. Although not all students in the academic unit were involved in the treatment, the remaining Risk level 1 and 2 students were part of a special admit program and, therefore, received specialized advising services (which, too, could act as a confounding variable by impacting academic performance and/or retention). Correlating the predicted and actual GPA of students in Risk levels 3 through 10 only would have constituted a restriction of range, and, thus, the decision was made to forego this analysis.

Another drawback in the risk classification phase was the instrumentation utilized for the study. In particular, the risk equation was developed using information from the institution's existing admissions application and new student questionnaire. Though the new student questionnaire contained items related to motivation, it was not purposefully designed as an in-depth measure of motivational attributes. The questionnaire contained items related to goal orientation, self-regulation and general self-efficacy, but lacked items related to attribution theory and locus of control. Also lacking were items related to other non-cognitive variables that have been linked to college academic performance such as personality factors and academic orientations. While the strength of the prediction of first-semester GPA was statistically significant, there was a high proportion of variance (approximately 75%) left unaccounted for that could possibly be explained through the inclusion of additional variables.

With regard to the application of the risk equation, difficulty was experienced with the timing and accuracy of the notification system. The equation relied upon the results of course placement examinations, which were administered and scored during new student orientation just prior to the first intervention meeting. Thus, little time could be allotted for the subsequent risk classification and communication of the results to the academic advising unit. Further, students were eligible to retake the Mathematics placement examination at a later date, which could result in a change in risk classification (typically due to a higher score). The categorization of risk levels were provided in advance of the first meeting for the majority of participants; however, a subset of students did not receive a facet of the intervention as envisioned or was overlooked for the intervention entirely. Moreover, re-classification of students' risk level at a later date could result in allocation of resources to students who no longer require an intervention.

Phase Two

The second phase of the research, the origination and implementation of the risk intervention, was limited by aspects of the scope and design of the study as well as the practical constraints of the applied research setting. Optimally, the study would have utilized a sample representative of the student population (i.e., breadth of majors) and employed a randomized design with groups of equal size for subsequent analyses. By using a convenience sample for the pilot study, undeclared students alone were the recipients of the intervention, thus not allowing for control of "major" as a potentially confounding variable. The decision to provide the intervention to all at-risk students in the participating advising unit meant compromising a control group in lieu of an ethical decision to not withhold potentially beneficial services.

Although based in the principles of intrusive advising, the conception of the intervention was influenced by staffing limitations and external constraints of the office of Measurement and Research that supplied the risk classifications. Mandatory, one-on-one sessions with academic advisors were limited in order to not stress the daily functioning of the advising center while the study was being conducted, and email and telephone contacts were used more readily. The decision to keep the academic advising staff blind to the conditions that led to students' risk classifications led to a "hit or miss" approach during the initial conversation. With specific information regarding a student's risk factors, discussions could have been individualized with targeted recommendations.

There were certain variables in the risk prediction equation that were not addressed through the intervention nor expressly examined in the study. Several items in the New Student Questionnaire were not included in the design of the intervention, as they were deemed to be characteristics that could not be readily influenced. However, the impact of these attributes and/or attitudes on student achievement may be worth further exploration. For example, diversity as a factor that influenced college choice (Item 57), strength of decision regarding college major (Item 62), and planned participation in faculty research (Item 67) could contribute to our understanding of academic achievement as well as lend themselves to the development of programs that support students success. Additionally, college affiliation, which yielded the highest beta weight in the equation, was not addressed in the scope of the study.

The information collected during the initial conversation with participants and at the point of final contact was unique to the participating advising unit. With the lack of similar data collected by other advising centers, no comparisons with the control group could be made. Therefore, it was not possible to ascertain whether the pattern of remarks would have also existed in Risk level 1 and 2 students within the other schools and colleges at the institution.

Future Directions

While the risk prediction and subsequent categorization system showed promise in the present study, modifications could be made to further enhance its effectiveness across the full continuum of risk levels. Since the predictive value of certain variables may change from year to year, a longitudinal approach could be employed. By tracking key variables that retain efficacy with each new cohort of incoming students, the prediction equation could be streamlined to include only the most essential cognitive and non-cognitive variables, and instrumentation could be adapted accordingly.

Instead of developing the risk equation with an entire cohort of incoming freshmen, the prediction efforts could focus on subgroups of interest. For instance, the equation could be calibrated using only the lowest performing students in order to discover if distinctions among predictor variables exist. Not only could the discovery of associated variables help boost precision in the identification process, but also with the development of more specialized interventions based on the theoretical underpinnings of each level's needs. Theory-based recommendations would need to be balanced with practical considerations, such as availability of staffing for intervention implementation. For institutions with insufficient staff to personally administer all aspects of an intervention, technology-based adaptations could be explored (e.g., automated email contacts; registration holds for unsatisfactory progress reports).

While the present study made use of existing instrumentation at the institution, a more specialized questionnaire could be employed to detect at-risk students. Instrumentation could include existing inventories that tap into known prediction variables, or a new questionnaire could be developed for use in this type of application. If considering the design of a new instrument, the recommendation would be to include static variables in order to avoid variation in risk classification prior to the start of the first semester. The timing of administration of the inventory could also be modified to allow for earlier identification of at-risk students well in advance of their first contact with personnel at the institution. While focus of this study was early intervention for admitted students, the basic foundation of risk prediction could be applied to the admissions process and used instead as a screening mechanism.

The principles of risk prediction could be applied to a host of academic outcomes. While overall academic performance as measured by GPA was the main focus of the present study, other aspects of student success at the college-level could be considered. For example, predictors of success in particular courses or programs of study could be determined by using risk models, and students identified as at-risk could be targeted for support services at the course or major level.

Applications of the risk prediction equation need not focus only on students who are in jeopardy of falling below the minimum academic standards of an institution. Instead, categorization efforts can be used with students at all levels of academic performance in order to identify those who may be underachieving and/or not meeting their full academic potential. Honors programs, for example, could seek to identify students who may not maintain the academic standards of a rigorous program of study, or students who need to maintain a particular GPA for a financial scholarship could be similarly categorized and offered specialized support.

While support was found for the prediction equation in the present study, an early warning system could benefit from the use of a more sophisticated statistical technique beyond multiple regression. For example, the application of hierarchical linear modeling (HLM) to education research allows for treatment of nested data structures, which are inherent in a university setting (e.g., grade levels, classrooms). Less obvious forms of data structures are found in research using repeated-measures, as multiple observations can be considered to be nested within the individual. HLM is becoming more common in social science research, not only because of the applicability to nested data, but also the introduction of more accessible software packages (Osbourne, 2000). Neural networks and decision trees are being explored for use in educational research, specifically with regard to prediction accuracy. When compared with the effectiveness of more standard prediction techniques (i.e., logistic regression), neural networks have found support in recent studies due to increased accuracy with larger sets of predictors (Herzog, 2006). While promising, neural networks may be neither practical nor necessary depending upon the design and scope of the study.

When considering the development and implementation of a risk assessment program, the accuracy of prediction and the efficacy of the intervention are of equal importance. Both cognitive and non-cognitive variables can serve as predictors as well as guide the design of a program that supports college student achievement. Early identification of students who may be at risk of underachieving allows for the opportunity to intercede during the critical first year of study.

Epilogue

Since the initial pilot year of the risk intervention project as reported in this study, the host institution has modified the program to focus on student retention. The risk equation was adapted to include first-year retention as the dependent variable rather than academic performance, and students were categorized based on level of risk for leaving the institution. In practice, risk level assignments were made transparent to academic advising staff, and advisors were provided with access to the variables that led to students' categorizations. Students, on the other hand, still remained uninformed of their risk status. Revisions in the process have allowed for targeted, personalized contacts with at-risk students, which included in-person sessions as well as telephone and email contact. Once the modifications were made and another pilot year was completed, the risk program was adopted by other advising units at the institution during the

Fall 2010 semester. The institution has highlighted the risk-based retention effort as one of a triumvirate of academic advising initiatives focused on student achievement, and a positive impact on the retention rate of students at high risk of dropping out has already been noted (Hoffman, 2010).

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APPENDIX A

NEW STUDENT QUESTIONAIRRE, SUMMER 2008

Students' Responses to the New Student Questionnaire

Summer 2008

	Freshmen			Transfers		
	N	%	Median	N	%	Median
1. Gender						
a. Male	1922	45.7%		457	46.1%	
b. Female	2286	54.3%		534	53.9%	
2. Age						
a. 16 or younger	15	0.4%		0	0.0%	
b. 17-18	3950	93.9%		78	7.9%	
c. 19-21	231	5.5%		637	64.3%	
d. 22-25	8	0.2%		177	17.9%	
e. 26 or older	3	0.1%		98	9.9%	
3. In which class will you be during your first semester at [institution]?						
a. Freshman	4202	99.9%		120	12.4%	
b. Sophomore	3	0.1%		451	46.6%	
c. Junior	2	0.0%		337	34.8%	
d. Senior	0	0.0%		16	1.7%	
e. Other	1	0.0%		44	4.5%	
4. Is English your native language?						
a. Yes	3721	88.5%		816	82.8%	
b. No	485	11.5%		170	17.2%	
5. During the school year, on the average, how many hours do you plan to work (for money) per week?						
a. None	861	20.7%		123	12.5%	
b. 1 to 15 hours	1857	44.6%	10.4	264	26.8%	
c. 16 to 20 hours	1069	25.7%		304	30.8%	17.2
d. 21 to 25 hours	263	6.3%		131	13.3%	
e. More than 25 hours	112	2.7%		164	16.6%	
6. In what kind of residence will you be living during your first semester at [institution]?						
a. University-owned housing (including residence halls)	3337	79.4%		166	16.9%	
b. Home of parents/relatives	665	15.8%		318	32.4%	
c. Your own home or apartment	179	4.3%		466	47.5%	
d. Other	21	0.5%		32	3.3%	
7. Where is your permanent home?						
a. City of Philadelphia	650	15.5%		291	29.5%	
b. Suburban Philadelphia	1079	25.7%		298	30.2%	
c. Pennsylvania, other than suburban Philadelphia	1322	31.5%		247	25.0%	
d. United States, other than Pennsylvania	1085	25.8%		130	13.2%	
e. Other country	64	1.5%		21	2.1%	
8. What is your U.S. Military status?						
a. No military service	4115	98.4%		949	96.3%	
b. Active military service	7	0.2%		1	0.1%	
c. Veteran	6	0.1%		16	1.6%	
d. Reserves or ROTC	28	0.7%		5	0.5%	
e. Other	26	0.6%		14	1.4%	

	Freshmen			Transfers		
	N	%	Median	N	%	Median
9. What is your best estimate of the total income of your PARENTAL FAMILY during the past year?						
a. Less than $20,000	330	8.8%		119	13.2%	
b. $20,000 to $39,999	639	17.0%		185	20.5%	
c. $40,000 to $59,999	819	21.8%		186	20.6%	$55,752
d. $60,000 to $79,999	731	19.4%	$62,503	159	17.6%	
e. $80,000 or more	1240	33.0%		252	28.0%	
10. What is your best estimate of YOUR OWN total income during the past year?						
a. Less than $2,000	2224	55.1%	$1,815	322	33.8%	
b. $2,000 to $3,999	1257	31.2%		218	22.9%	$3,422
c. $4,000 to $5,999	346	8.6%		123	12.9%	
d. $6,000 to $7,999	124	3.1%		72	7.5%	
e. $8,000 or more	84	2.1%		219	23.0%	
11. Did you apply for financial aid from [institution] for this year?						
a. Yes, and I received an aid package	2641	64.7%		398	40.9%	
b. Yes, but I did not receive aid	361	8.8%		68	7.0%	
c. Yes, but I have yet to hear about an aid package	301	7.4%		219	22.5%	
d. No, but I intend to apply	307	7.5%		174	17.9%	
e. No, I will not need financial aid to attend [institution]	472	11.6%		113	11.6%	
12. How did the amount of financial aid you received from [institution] compare to other schools to which you were admitted?						
a. Higher than most	538	13.6%		84	9.3%	
b. About the same	1066	26.9%		263	29.1%	
c. Lower than most	735	18.6%		122	13.5%	
d. Applied for aid only at [institution]	943	23.8%		170	18.8%	
e. Did not apply for financial aid	678	17.1%		264	29.2%	
13. Do you have any concern about your ability to finance your college education?						
a. None (I am confident that I will have sufficient funds)	1137	27.3%		231	23.5%	
b. Some concern (but I will probably have enough funds)	2556	61.4%		552	56.2%	
c. Major concern (not sure I will have enough funds to complete college)	473	11.4%		200	20.3%	
14. What was your rating of [institution] at the time you applied for admission?						
a.[institution] was my first choice	2295	55.0%		768	78.4%	
b.[institution] was my second choice	1340	32.1%		180	18.4%	
c.[institution] was my third or lower choice	541	13.0%		31	3.2%	
15. What is the highest level of formal education completed by your father?						
a. Did not graduate from high school	285	6.9%		63	6.5%	
b. Graduated from high school	1215	29.6%		301	31.3%	
c. Some college education	700	17.0%		224	23.3%	
d. Graduated from college (a bachelor's degree)	1166	28.4%		237	24.6%	
e. Postgraduate or professional degree	744	18.1%		137	14.2%	

	Freshmen			Transfers		
	N	%	Median	N	%	Median
16. What is the highest level of formal education completed by your mother?						
a. Did not graduate from high school	222	5.3%		78	8.0%	
b. Graduated from high school	1001	24.1%		251	25.8%	
c. Some college education	872	21.0%		261	26.9%	
d. Graduated from college (a bachelor's degree)	1340	32.3%		243	25.0%	
e. Postgraduate or professional degree	715	17.2%		138	14.2%	
17. What was your approximate high school average?						
a. A	1468	35.0%		178	18.3%	
b. B+	1474	35.2%		282	29.0%	
c. B	950	22.7%		272	27.9%	
d. B-	251	6.0%		135	13.9%	
e. C+ or lower	46	1.1%		107	11.0%	
18. What scholastic average do you expect to obtain in college?						
a. A	1865	44.7%		432	44.0%	
b. B+	1653	39.6%		386	39.3%	
c. B	609	14.6%		142	14.5%	
d. B-	40	1.0%		15	1.5%	
e. C+ or lower	7	0.2%		6	0.6%	
19. Scholastically, where did you rank in your high school graduating class?						
a. Top 10%	919	23.0%		134	14.3%	
b. Top 20%	1285	32.1%	18.9	204	21.8%	
c. Top 30%	973	24.3%		248	26.5%	25.7
d. Top 50%	707	17.7%		233	24.9%	
e. Not among top 50%	114	2.9%		117	12.5%	
20. In general, how well do you feel that your high school prepared you to do college work?						
a. Very well	1164	27.7%		253	25.8%	
b. Fairly well	2045	48.7%		417	42.6%	
c. Uncertain	807	19.2%		171	17.4%	
d. Poorly	159	3.8%		105	10.7%	
e. Very poorly	27	0.6%		34	3.5%	
21. Have you decided on an academic major?						
a. Yes	3212	76.6%		888	89.8%	
b. No	980	23.4%		101	10.2%	
22. Do you consider yourself to be a person who has a disability?						
a. Yes	85	2.0%		32	3.3%	
b. No	3974	94.7%		903	92.0%	
c. Uncertain	137	3.3%		46	4.7%	
23. During the school year, on the average, how many hours do you plan to study per week?						
a. None	77	1.9%		15	1.5%	
b. 1 to 15 hours	1840	44.2%		392	40.0%	
c. 16 to 20 hours	1562	37.6%		317	32.3%	
d. 21 to 25 hours	470	11.3%		155	15.8%	
e. More than 25 hours	210	5.0%		102	10.4%	

Questions 24 - 27

During high school (grades 9-12), how many years did you study each of the following subjects?

	Value	Freshmen N	Freshmen %	Freshmen Median	Transfers N	Transfers %	Transfers Median
24. English							
a. None	0	21	0.5%		13	1.3%	
b. One	1	20	0.5%		17	1.7%	
c. Two	2	20	0.5%		26	2.6%	
d. Three	3	66	1.6%		71	7.2%	
e. Four	4	4076	97.0%	4.0	860	87.1%	3.9
25. Mathematics							
a. None	0	14	0.3%		7	0.7%	
b. One	1	20	0.5%		14	1.4%	
c. Two	2	31	0.7%		50	5.1%	
d. Three	3	576	13.7%		212	21.5%	
e. Four	4	3561	84.7%	3.9	702	71.3%	3.8
26. Foreign Language							
a. None	0	69	1.6%		76	7.7%	
b. One	1	168	4.0%		106	10.8%	
c. Two	2	1275	30.3%		377	38.3%	2.3
d. Three	3	1397	33.2%	2.9	242	24.6%	
e. Four	4	1296	30.8%		183	18.6%	
27. Natural Sciences							
a. None	0	23	0.5%		20	2.0%	
b. One	1	54	1.3%		32	3.3%	
c. Two	2	130	3.1%		100	10.2%	
d. Three	3	1196	28.5%		286	29.1%	
e. Four	4	2798	66.6%	3.7	545	55.4%	3.6

Questions 28 - 31

During high school (grades 9-12), how much did you like each of the following subjects?

	Value	Freshmen N	Freshmen %	Freshmen Median	Transfers N	Transfers %	Transfers Median
28. English							
a. Liked very much	5	1418	33.7%		381	38.7%	
b. Liked somewhat	4	1617	38.5%	4.1	337	34.2%	4.2
c. No feeling one way or the other	3	591	14.1%		136	13.8%	
d. Disliked somewhat	2	425	10.1%		93	9.5%	
e. Disliked very much	1	153	3.6%		37	3.8%	
29. Mathematics							
a. Liked very much	5	948	22.5%		217	22.0%	
b. Liked somewhat	4	1269	30.2%	3.6	242	24.6%	
c. No feeling one way or the other	3	569	13.5%		125	12.7%	3.2
d. Disliked somewhat	2	808	19.2%		178	18.1%	
e. Disliked very much	1	612	14.6%		223	22.6%	
30. Foreign Language							
a. Liked very much	5	763	18.2%		180	18.5%	
b. Liked somewhat	4	1293	30.8%		317	32.5%	3.5
c. No feeling one way or the other	3	941	22.4%	3.5	256	26.3%	
d. Disliked somewhat	2	730	17.4%		106	10.9%	
e. Disliked very much	1	471	11.2%		115	11.8%	
31. Natural Sciences							
a. Liked very much	5	1028	24.4%		308	31.3%	
b. Liked somewhat	4	1508	35.9%	3.8	327	33.3%	3.9
c. No feeling one way or the other	3	869	20.7%		189	19.2%	
d. Disliked somewhat	2	554	13.2%		104	10.6%	
e. Disliked very much	1	246	5.9%		55	5.6%	

Questions 32 - 38

How important were the following in your decision to go to college?	Value	Freshmen N	Freshmen %	Freshmen Median	Transfers N	Transfers %	Transfers Median
32. I wanted to get a general education.							
a. Very important	3	3361	80.3%	2.9	783	79.3%	2.9
b. Somewhat important	2	735	17.6%		170	17.2%	
c. Not important	1	90	2.2%		35	3.5%	
33. My parents wanted me to go.							
a. Very important	3	1671	39.9%		389	39.6%	
b. Somewhat important	2	1486	35.5%	2.2	334	34.0%	2.2
c. Not important	1	1033	24.7%		259	26.4%	
34. I wanted to get away from home.							
a. Very important	3	1218	29.0%		201	20.6%	
b. Somewhat important	2	1497	35.7%	1.9	280	28.7%	
c. Not important	1	1478	35.2%		495	50.7%	1.5
35. I wanted to be able to get a better job.							
a. Very important	3	3472	82.7%	2.9	875	88.7%	2.9
b. Somewhat important	2	506	12.1%		85	8.6%	
c. Not important	1	220	5.2%		27	2.7%	
36. I wanted to learn more about things that interest me.							
a. Very important	3	3454	82.2%	2.9	812	82.2%	2.9
b. Somewhat important	2	671	16.0%		158	16.0%	
c. Not important	1	79	1.9%		18	1.8%	
37. I wanted to prepare myself for graduate or professional school.							
a. Very important	3	2499	59.6%	2.7	644	65.3%	2.7
b. Somewhat important	2	1178	28.1%		234	23.7%	
c. Not important	1	516	12.3%		108	11.0%	
38. It seemed like a good thing to do as a transition to work.							
a. Very important	3	1420	34.1%		387	39.6%	
b. Somewhat important	2	1651	39.6%	2.1	348	35.6%	2.2
c. Not important	1	1093	26.2%		243	24.8%	

Questions 39 - 40

How important were the following in your finding out about or selecting [institution]?	Freshmen N	Freshmen %	Transfers N	Transfers %
39. Personal call or letter from [institution] faculty member or student				
a. Very important	722	17.5%	184	19.2%
b. Somewhat important	1097	26.7%	177	18.4%
c. Not important	1060	25.8%	194	20.2%
d. Does not apply / did not attend	1235	30.0%	405	42.2%
40. High school visit by [institution] representative				
a. Very important	456	11.1%	63	6.6%
b. Somewhat important	789	19.3%	128	13.5%
c. Not important	769	18.8%	192	20.2%
d. Does not apply / did not attend	2083	50.8%	568	59.7%

Questions 41 - 45

How important were the following in your finding out about or selecting [institution]?	Freshmen N	Freshmen %	Transfers N	Transfers %
41. College Fair				
a. Very important	364	8.9%	88	9.3%
b. Somewhat important	971	23.8%	172	18.1%
c. Not important	854	20.9%	180	19.0%
d. Does not apply / did not attend	1898	46.4%	508	53.6%
42. E-mail communication from [institution]				
a. Very important	772	18.7%	159	16.7%
b. Somewhat important	1440	34.9%	204	21.4%
c. Not important	1046	25.3%	196	20.5%
d. Does not apply / did not attend	873	21.1%	395	41.4%
43.[institution]'s web site				
a. Very important	1628	39.1%	417	42.8%
b. Somewhat important	1623	38.9%	332	34.1%
c. Not important	681	16.3%	108	11.1%
d. Does not apply / did not attend	236	5.7%	117	12.0%
44.[institution] open house or reception				
a. Very important	1859	44.9%	166	17.4%
b. Somewhat important	809	19.5%	192	20.1%
c. Not important	344	8.3%	135	14.2%
d. Does not apply / did not attend	1130	27.3%	460	48.3%
45. Regular campus visit / tour				
a. Very important	2469	59.4%	309	32.3%
b. Somewhat important	816	19.6%	216	22.5%
c. Not important	220	5.3%	106	11.1%
d. Does not apply / did not attend	649	15.6%	327	34.1%

Questions 46 - 49 Below are some reasons that might have influenced your decision to attend [institution]. How important was each reason in your decision to come here?

	Value	Freshmen N	Freshmen %	Freshmen Median	Transfers N	Transfers %	Transfers Median
46. Affordable tuition							
a. Very important positive factor	3	2636	63.1%	2.7	624	63.5%	2.7
b. Somewhat important positive factor	2	1216	29.1%		270	27.5%	
c. Not a positive factor	1	327	7.8%		89	9.1%	
47.[institution]'s size							
a. Very important positive factor	3	1672	39.9%		296	30.2%	
b. Somewhat important positive factor	2	2125	50.7%	2.3	515	52.5%	2.1
c. Not a positive factor	1	395	9.4%		170	17.3%	
48. Social atmosphere							
a. Very important positive factor	3	2592	61.9%	2.7	455	46.5%	
b. Somewhat important positive factor	2	1425	34.0%		418	42.7%	2.4
c. Not a positive factor	1	170	4.1%		105	10.7%	
49. Closeness to home							
a. Very important positive factor	3	1722	41.3%		517	52.7%	2.6
b. Somewhat important positive factor	2	1744	41.9%	2.3	325	33.1%	
c. Not a positive factor	1	700	16.8%		139	14.2%	

Questions 50 - 58 Below are some reasons that might have influenced your decision to attend [institution]. How important was each reason in your decision to come here?

	Value	Freshmen N	Freshmen %	Freshmen Median	Transfers N	Transfers %	Transfers Median
50. Location in a large city							
a. Very important positive factor	3	2619	62.5%	2.7	515	52.7%	2.6
b. Somewhat important positive factor	2	1249	29.8%		314	32.1%	
c. Not a positive factor	1	322	7.7%		148	15.1%	
51. Variety of programs available							
a. Very important positive factor	3	2980	71.1%	2.8	701	71.3%	2.8
b. Somewhat important positive factor	2	1090	26.0%		236	24.0%	
c. Not a positive factor	1	123	2.9%		46	4.7%	
52. Reputation of [institution]							
a. Very important positive factor	3	2300	54.9%	2.6	620	63.2%	2.7
b. Somewhat important positive factor	2	1632	39.0%		308	31.4%	
c. Not a positive factor	1	257	6.1%		53	5.4%	
53. Reputation of your specific major at [institution]							
a. Very important positive factor	3	2304	55.2%	2.6	584	59.7%	2.7
b. Somewhat important positive factor	2	1508	36.1%		330	33.7%	
c. Not a positive factor	1	364	8.7%		65	6.6%	
54. Advice and experience of parents or relatives							
a. Very important positive factor	3	1234	29.7%		283	29.1%	
b. Somewhat important positive factor	2	1997	48.1%	2.1	425	43.7%	2.0
c. Not a positive factor	1	918	22.1%		264	27.2%	
55. Advice and experience of friends							
a. Very important positive factor	3	1455	35.1%		410	42.0%	
b. Somewhat important positive factor	2	2001	48.3%	2.2	416	42.6%	2.3
c. Not a positive factor	1	689	16.6%		151	15.5%	
56. Meeting students with backgrounds and interests similar to yours							
a. Very important positive factor	3	1511	36.5%		350	35.9%	
b. Somewhat important positive factor	2	2032	49.0%	2.2	446	45.7%	2.2
c. Not a positive factor	1	600	14.5%		180	18.4%	
57. Meeting students with backgrounds and interests different from yours							
a. Very important positive factor	3	1437	34.7%		313	32.1%	
b. Somewhat important positive factor	2	2047	49.4%	2.2	469	48.1%	2.1
c. Not a positive factor	1	658	15.9%		194	19.9%	
58. Availability of financial aid							
a. Very important positive factor	3	1937	46.8%		476	48.7%	
b. Somewhat important positive factor	2	1413	34.2%	2.4	301	30.8%	2.5
c. Not a positive factor	1	787	19.0%		201	20.6%	

Questions 59 - 67

What is the chance that you will do the following while you are at [institution]?

	Value	Freshmen N	Freshmen %	Freshmen Median	Transfers N	Transfers %	Transfers Median
59. Change your major field of study							
a. Very good chance	4	864	20.7%		121	12.4%	
b. Some chance	3	1341	32.1%	2.6	188	19.2%	
c. Very little chance	2	1489	35.6%		382	39.1%	2.0
d. No chance	1	484	11.6%		287	29.3%	
60. Participate in an honors program							
a. Very good chance	4	987	23.6%		176	18.0%	
b. Some chance	3	1976	47.2%	2.9	508	52.0%	2.9
c. Very little chance	2	977	23.4%		239	24.5%	
d. No chance	1	244	5.8%		54	5.5%	
61. Be a student leader							
a. Very good chance	4	803	19.2%		176	18.0%	
b. Some chance	3	2119	50.7%	2.9	429	43.9%	2.8
c. Very little chance	2	1071	25.6%		293	30.0%	
d. No chance	1	186	4.5%		80	8.2%	
62. Work full time while attending college							
a. Very good chance	4	265	6.3%		192	19.6%	
b. Some chance	3	983	23.5%		263	26.8%	
c. Very little chance	2	1963	47.0%	2.1	332	33.8%	2.4
d. No chance	1	966	23.1%		194	19.8%	
63. Join a social organization or club							
a. Very good chance	4	2380	56.9%	3.6	378	38.7%	
b. Some chance	3	1452	34.7%		401	41.1%	3.2
c. Very little chance	2	296	7.1%		154	15.8%	
d. No chance	1	55	1.3%		43	4.4%	
64. Play varsity / intercollegiate athletics							
a. Very good chance	4	640	15.3%		91	9.4%	
b. Some chance	3	977	23.4%		199	20.5%	
c. Very little chance	2	1383	33.1%	2.2	306	31.4%	1.9
d. No chance	1	1177	28.2%		377	38.7%	
65. Need more than four years to complete degree requirements							
a. Very good chance	4	582	14.0%		140	14.4%	
b. Some chance	3	914	22.0%		254	26.2%	
c. Very little chance	2	1795	43.1%	2.2	312	32.1%	2.2
d. No chance	1	869	20.9%		265	27.3%	
66. Make close friends							
a. Very good chance	4	3528	84.2%	3.9	616	62.9%	3.7
b. Some chance	3	611	14.6%		299	30.5%	
c. Very little chance	2	43	1.0%		54	5.5%	
d. No chance	1	8	0.2%		10	1.0%	
67. Work with a professor on a research project							
a. Very good chance	4	1491	35.8%		352	36.0%	
b. Some chance	3	2172	52.1%	3.2	455	46.6%	3.2
c. Very little chance	2	460	11.0%		155	15.9%	
d. No chance	1	47	1.1%		15	1.5%	

Questions 68 - 73

What is the chance that you will do the following while you are at [institution]?

	Value	Freshmen N	Freshmen %	Freshmen Median	Transfers N	Transfers %	Transfers Median
68. Receive encouragement from family while you're in college							
a. Very good chance	4	3425	81.9%	3.9	747	76.4%	3.8
b. Some chance	3	621	14.9%		168	17.2%	
c. Very little chance	2	105	2.5%		50	5.1%	
d. No chance	1	30	0.7%		13	1.3%	
69. Get tutoring help in specific courses							
a. Very good chance	4	1321	31.6%		399	40.9%	
b. Some chance	3	2012	48.2%	3.1	400	41.0%	3.3
c. Very little chance	2	775	18.6%		149	15.3%	
d. No chance	1	67	1.6%		27	2.8%	
70. Transfer to another college before graduating							
a. Very good chance	4	147	3.5%		21	2.2%	
b. Some chance	3	709	17.1%		102	10.6%	
c. Very little chance	2	2298	55.3%	2.0	383	39.6%	1.6
d. No chance	1	1003	24.1%		460	47.6%	
71. Be satisfied with [institution]							
a. Very good chance	4	2925	70.0%	3.8	638	65.4%	3.7
b. Some chance	3	1213	29.0%		323	33.1%	
c. Very little chance	2	32	0.8%		11	1.1%	
d. No chance	1	7	0.2%		4	0.4%	
72. Find a job after college in your chosen field of study							
a. Very good chance	4	3235	77.4%	3.9	793	80.8%	3.9
b. Some chance	3	882	21.1%		163	16.6%	
c. Very little chance	2	49	1.2%		21	2.1%	
d. No chance	1	16	0.4%		4	0.4%	
73. Participate in volunteer or community service work							
a. Very good chance	4	1651	39.5%		378	38.6%	
b. Some chance	3	1912	45.7%	3.3	421	43.0%	3.2
c. Very little chance	2	550	13.1%		143	14.6%	
d. No chance	1	70	1.7%		37	3.8%	

Question 74

Please indicate your level of agreement with each of the following statements:

	Freshmen N	Freshmen %	Transfers N	Transfers %
74. Most of my teachers considered me one of the harder workers in their class.				
a. Definitely agree	1832	44.0%	413	42.5%
b. Somewhat agree	1551	37.2%	383	39.4%
c. Neither agree or disagree	528	12.7%	132	13.6%
d. Somewhat disagree	171	4.1%	32	3.3%
e. Definitely disagree	85	2.0%	12	1.2%

Questions 75 - 81 Please indicate your level of agreement with each of the following statements:

	Freshmen N	Freshmen %	Transfers N	Transfers %
75. I find it difficult to keep a plan of action in my school work.				
a. Definitely agree	135	3.2%	40	4.1%
b. Somewhat agree	891	21.4%	187	19.2%
c. Neither agree or disagree	841	20.2%	178	18.2%
d. Somewhat disagree	1298	31.2%	293	30.0%
e. Definitely disagree	994	23.9%	278	28.5%
76. I enjoy studying and reading about things on which I am working.				
a. Definitely agree	1242	29.8%	460	47.1%
b. Somewhat agree	1733	41.5%	359	36.7%
c. Neither agree or disagree	867	20.8%	116	11.9%
d. Somewhat disagree	285	6.8%	28	2.9%
e. Definitely disagree	44	1.1%	14	1.4%
77. I know how to manage my time well.				
a. Definitely agree	962	23.1%	302	30.9%
b. Somewhat agree	1826	43.8%	432	44.2%
c. Neither agree or disagree	732	17.6%	131	13.4%
d. Somewhat disagree	538	12.9%	93	9.5%
e. Definitely disagree	111	2.7%	19	1.9%
78. I am self confident.				
a. Definitely agree	1878	45.1%	508	52.1%
b. Somewhat agree	1530	36.7%	337	34.6%
c. Neither agree or disagree	481	11.5%	73	7.5%
d. Somewhat disagree	202	4.8%	40	4.1%
e. Definitely disagree	76	1.8%	17	1.7%
79. My plans have frequently seemed so full of difficulties that I have had to give them up.				
a. Definitely agree	85	2.1%	26	2.7%
b. Somewhat agree	340	8.2%	116	11.9%
c. Neither agree or disagree	985	23.8%	225	23.1%
d. Somewhat disagree	1446	34.9%	278	28.5%
e. Definitely disagree	1288	31.1%	329	33.8%
80. I am organized and have good study habits.				
a. Definitely agree	809	19.5%	293	30.0%
b. Somewhat agree	1695	40.8%	386	39.5%
c. Neither agree or disagree	990	23.8%	200	20.5%
d. Somewhat disagree	543	13.1%	82	8.4%
e. Definitely disagree	118	2.8%	15	1.5%
81. I prefer to be independent of others in deciding what I want to do.				
a. Definitely agree	1568	39.1%	459	48.4%
b. Somewhat agree	1333	33.2%	303	31.9%
c. Neither agree or disagree	829	20.7%	150	15.8%
d. Somewhat disagree	237	5.9%	26	2.7%
e. Definitely disagree	44	1.1%	11	1.2%

APPENDIX B

ACADEMIC PERFORMANCE SELF-ASSESSMENT

Please rate how strongly you agree or disagree with each of the following statements by choosing the appropriate number.

1 = strongly disagree, 2 = disagree, 3 = Neither agree, nor disagree, 4 = agree, 5 = strongly agree

1. I spent too much time on one course and fell behind in my other courses.
2. My instructors were clear; I could understand what my instructors were talking about.
3. I have good time management skills.
4. My classes were harder than I expected them to be.
5. I kept up with the assigned readings for all of my classes.
6. I thought I knew the material, but I still had difficulty doing well on exams.
7. I should have dropped or withdrawn from classes but I waited until it was past the deadline.
8. I skipped three or more classes this past semester.
9. I have a hard time writing papers.
10. I usually took notes during classes.
11. I have a difficult time with math.
12. I attended classes regularly.
13. I procrastinated and then I did not have time to complete assignments or study for tests/exams.
14. I spent too much time socializing and not enough time studying.

15. I had personal problems that prevented me from doing well this past semester.
16. I have friends and/or family who support my educational goals.
17. I used alcohol and/or other drugs to the extent that I was unable to do well in classes.
18. I felt anxious and/or depressed so I really couldn't focus on school work.
19. I have clear academic and career goals.
20. I experienced a crisis and/or death of a loved one that interfered with my ability to do well.
21. I am struggling because I do not have a declared major.
22. Medical issues impacted my performance in classes this past semester.
23. My work schedule prevented me from doing well in school.
24. I do not even know why I am in college.
25. I am comfortable with my living situation.
26. I worry about how I am going to pay for school expenses (tuition, fees, books, etc).
27. I believe I will be successful in future semesters.
28. I felt overwhelmed this past semester because I had so much school work to do.
29. My high school prepared me for college level courses.
30. I used resources like the [tutoring centers].
31. Please take a moment to elaborate on answers to any of the questions above and/or tell us about anything else that prevented you from doing well in your courses this past semester.

APPENDIX C

ACADEMIC WARNING AND PROBATION PROGRAM QUIZ

True or False

1. If you have 36 credits, a cumulative GPA of 2.0 or higher, and a semester GPA below 2.0, you will be placed on academic warning.
2. Academic Warning and Academic Probation are the same.
3. If you are on Academic Probation at the end of the academic year (spring), you may not be eligible for certain types of financial aid.
4. If you are on Academic Warning or Academic Probation, you **can** look up classes in [student information system] using "Find a Course" but **cannot** register online.
5. After being dismissed, you may never return to [name of university].
6. When you repeat a class only the last attempt appears on your transcript and is used for calculating your GPA.
7. In weeks three through nine of the fall or spring semester, or during weeks three and four of summer sessions, you may withdraw from a course with your advisor's assistance.
8. In [student information system] your Academic Progress Report for one course the instructor indicated you never attended. You have been going to every class so you should ignore the Report.
9. I have completed the Academic Probation Self-Assessment.
10. I have viewed the presentation in its entirety.

APPENDIX D

CONVERSATION POINTS FOR INCOMING RISK STUDENTS

*Q. Would you consider yourself organized with school work and good at managing your time?**

Recommendation: Suggest that time management is one of the biggest challenges, as more "free time" can often lead to not using it well. Remind them of Freshman Focus Week & RCC workshops.

*Q. Did you work hard for your grades in high school, or did your grades come easy with little effort? **

Recommendation: Explained to student that effort level may need to be adjusted for college, as subjects that had previously come easy are now being taught at a different level/speed. Remind them of workshops for study habits/time management (as above).

Q: Do you plan to work during the school year?

Recommendation: Students should work **20 hours or less** and attempt to find an **on-campus job. ***

Q. Do you enjoy math and science?

Recommendation: Students should keep in mind the **Math & Science Resource Center** and utilize it for assistance with these courses. Suggest going as soon as the semester begins in order to keep up with assignments (rather than wait until difficulty arises).**

Q. Are you living away from home for the first time? Do you have any concerns about it?

Recommendation: Invite the student to come in and speak with an advisor if they begin to experience difficulty being away from home, with a roommate, etc. We can make appropriate referrals at that time.

*Can broach the topic of study time outside (2-3 hours per credit formula)

3 credit hours (1 course) = 3 hours in class per week = 6-9 hours study time per week.

14 credit hours (4 courses) = 14 hours in class per week = 28-42 hours study time per week.

**Can discuss in terms of course & major selection (for undeclared); pre-reqs for Nursing (as the curriculum is math/science heavy)

For the advising database notes:

We also discussed issues that can impact first-year students, and I provided you with information & reminders about resources to assist you [Customize based on student's responses to the above questions; provide a reminder about support services handout and any applicable web resources]. I invited you to return with any concerns at all, academic or otherwise.

APPENDIX E

FALL MID-SEMESTER ACADEMIC PROGRESS REPORTS CORRESPONDENCE

Hello, (Name of student),

In reviewing your academic progress reports, I noted that (insert number) of your ratings showed that you were having some difficulty in a course (you can view your academic progress reports under the Academic History tab in [student information system]). If you have not done so already, I would recommend that you speak with your professors and ask about how you can improve your performance in the class.

Please also keep in mind free services that can assist you, such as:

- For assistance with writing assignments: [tutoring center location and website provided]
- For math and science courses: [tutoring center location and website provided]
- For academic study skills and additional tutoring (including online tips): [tutoring center location and website provided]

If you do not believe you can successfully complete a course, or feel that you need to lighten your overall course load, please consider a course withdrawal. An academic advisor can review your situation and help you determine if a course withdrawal is appropriate. The deadline is [date of withdrawal deadline], so please plan to meet with an advisor by that date.

I welcome you to meet with me or an academic advisor in our center [advising center location] to discuss your first-semester experience. We are here to help you succeed!

APPENDIX F

FINAL EXAMINATION CORRESPONDENCE

Hello! Final exams are approaching, and attached you will find suggestions for how to prepare for your first set of college final examinations. Included are the **Top 10 tips to help you survive finals** and **Study skills & Stress management for college student exam week**. If you have any questions or concerns as you are wrapping up your first semester, please do not hesitate to contact one of your academic advisors.

Tip: Each semester, the final exam schedule can be found on the Academic Records website [website provided].

Final Exam Tips

Here are some suggestions for making your first college-level final exams a success!

Top 10 tips to help you survive finals!

(Adapted from Surviving College Life, www.survivingcollegelife.com/2007/11/29/33/)

1. **Mark Your Deadlines.** First, mark deadlines like paper due dates and test times. Next, check for conflicts if you have two tests that overlap, or if you're scheduled for work during a test time, you need to resolve that as quickly as possible.

2. **Set a Study Schedule.** While you have your calendar out, mark out your study plan for the days ahead -you don't want to be studying for a history test on Friday if you have a Math test tomorrow. Schedule time for the nearest deadlines first, and break your time into hours and

subjects. Don’t try to spend all day studying one thing or you will burn out. Also, remember that it will probably take you longer than you think to write a paper.

3. **Take Care of Your Body.** If you don’t take care of your body, you could hit a slump right when you need the most energy. Take time to eat healthy meals (that means fruits and veggies, carbs and proteins, not just a Snickers bar and a Gatorade) and schedule time for sleep.

4. **Gather Your Supplies.** Get your supplies: Blue Books, Scantrons, pens, pencils–well before the test starts. You don’t want to have to ask your professor if he or she has a spare Scantron.

5. **Make Outlines.** One of the best ways to keep focused on what you’re studying is to make an outline. It helps if you pick out the key points which can serve as a study tool for later.

6. **Rewrite Notes.** Having a hard time making your lecture notes stick? Rewriting your notes takes longer than skimming them. The extra time you spend rewriting can help engrain the information in your mind.

7. **Get Creative.** Everyone has a different studying style - some people are visual learners, others are better at listening. Find out what works for you, and do it. This can be anything from putting sticky notes with hard-to-remember facts on your computer monitor, to listening to podcasts of lectures while you eat breakfast.

8. **Be Honest.** With all the stress and tension that goes on during this time, some students are tempted to get someone else to write their paper, to sneak an answer from the person next to them, or to plagiarize. It definitely isn’t worth it. Professors check for plagiarism, and the consequences of cheating on just one test could cost you your GPA (or worse).

9. **Take Breaks.** Your mind needs time to rest and refresh, so taking breaks can help you feel more alert. Make time to go for a walk, hit the gym, call a friend, or even watch some TV - it will help you refresh your mind.

10. **Finesse.** For final papers, get someone to proof read! This is especially critical if you've done the whole paper all in one sitting. Also, make sure you staple your paper. You'd be surprised how many people turn in paper clipped or dog-eared final papers - you look unprepared, which could affect your grade.

Study skills & stress management for college student exam week

(Adapted from Suite 101, http://collegeuniversity.suite101.com)

Time management. Plan, plan, plan. Before finals begin, get out your calendar and schedule as much of your finals week as possible. Then stick with the schedule.

Schedule in study breaks. Don't plan to study non-stop for the next five days. You'll go insane, and you'll be too fried to do well on the exams. When you write your schedule, include short study breaks to help you recharge. You'll feel so much better and will be able to concentrate much more.

Schedule in sleep. Some people can function well on three hours of sleep a night. Most cannot. You'll do much better during exams if your mental state is good, and sleep is essential for this.

Exercise. There's no better source for stress relief. Just don't overdo it to the point that you're procrastinating heavily. Go for short, stress-relieving activities, like a treadmill run or brisk walk.

Prioritize. You have limited time to study and will have to choose what to spend the most time with.

Form effective study groups. Choose fellow students who will challenge your learning. Avoid “groupthink” (groupthink is what happens when someone in a group suggests an idea, and everyone accepts the idea without considering other possible options).

Free your schedule. As much as possible, eliminate other responsibilities. Work fewer hours. Put off social events. Definitely put off shopping.

Ask your professor for help. If you're confused about your notes or the readings, go to the resident expert. This works much better if you don't put off studying until the last minute.

Keep things in perspective. Excessive stress may hurt your performance on tests, so as much as you can, relax. And if you're having serious problems with anxiety during final exams, seek help at your school's counseling center. This is a common problem that schools are well equipped to help you with.

APPENDIX G

ACADEMIC WARNING AND PROBATION PROGRAM EMAIL

Subject: Urgent Message - Academic Warning - Spring Registration

You are receiving this email because you are a [academic division] student on Academic Warning after the fall 2008 semester. We are writing because we want you to know that your advisors are available to help. Please read the following information carefully so that you know what you are **required** to do next.

When you are placed on Academic Warning you are no longer able to register/revise your schedule using [the student information system]. You will need to complete the steps listed below **BEFORE** you come in to meet with an advisor to register and/or make changes to your current schedule.

1. Check Blackboard for the course
2. Access the course and read the "Announcements" section
3. Complete the "Self Assessment"
4. View the presentation
5. Take the quiz

How to Register/Revise Your Schedule

If you need to register or make revisions to your current schedule, use [the student information system] (click on "Register/Roster" and "Find a Course") to look for open sections and bring a list of 6-digit course reference numbers (several for each course) when you come in to see an advisor.

If you do not know which courses you need to take, come in to see an advisor. We will help you create a list of courses so that you can look for open sections.

Completing [the academic warning and probation program] and meeting with an advisor will help us to assist you as you work towards removing yourself from Academic Warning. We hope to see you soon.

APPENDIX H

SPRING MID-SEMESTER ACADEMIC PROGRESS REPORTS CORRESPONDENCE

Satisfactory Performance:

Subject: Academic Progress Report Satisfactory - Congratulations

I am writing to congratulate you as I just reviewed your academic progress reports (you can view your academic progress reports under the Academic History tab in [student information system]) and noticed that your instructors have indicated that you are performing satisfactorily in all of your courses this semester. Great job!

Even though you seem to be doing well in all of your courses, I would like to invite you to come in and meet with an Academic Advisor to talk about your experience as a first year student at [institution] and any other issue(s) you would like to discuss. If you would like to meet with me, please call [phone number] to schedule an appointment today. We are here to help you succeed.

Congratulations again on a job well done.

Less than Satisfactory Performance:

Subject: Important Message - Academic Progress Report

In reviewing your academic progress reports, I noted that you may be having some difficulty in a course (you can view your academic progress reports under the Academic History tab in [student information system]). If you have not done so already, I recommend that you speak with your instructors about your progress in courses so far.

Please also keep in mind free academic resources:

- For assistance with writing assignments: [tutoring center location and website provided]
- For math and science courses: [tutoring center location and website provided]
- For academic study skills and additional tutoring (including online tips): [tutoring center location and website provided]

If you do not believe you can successfully complete a course, or feel that you need to lighten your overall course load, you may want to consider a course withdrawal. An academic advisor can review your situation and help you determine if a course withdrawal is appropriate. The deadline is [date provided]. Please note: withdrawals need to be processed with an advisor.

We hope you come in to meet with an advisor [advising center location] to discuss your first year experience. We are here to help you succeed.

APPENDIX I

SECOND-YEAR RETENTION CORRESPONDENCE

Subject: Important Message - Fall Registration

I am writing because the fall semester begins in less than three weeks and as of today you are not yet registered for fall courses. This is a reminder that you are able to register on your own using [student information system], however if you would like assistance with choosing courses I encourage you to come in to see an academic advisor. Please call to schedule an appointment or come in during our walk-in hours - Monday through Thursday, 8:30am to 5:00pm (please arrive by 4:30pm). We will begin seeing students on a walk-in only basis starting [date].

We hope to hear from you soon.

Subject: Important Message - Fall Registration - Academic Warning/Probation

I am writing because the fall semester begins in less than three weeks and as of today you are not yet registered for fall courses. Since you are currently on academic warning/probation you will need to register in person with an advisor. If you have not already completed [academic warning and probation program] (accessible via Blackboard), please do so before you come in to meet with an advisor.

When you come in we will help you choose classes and go over strategies you can use to improve your grade point average. If you already completed [the academic warning and probation system] and have a list of courses you want to take this fall, please come in with a list of course reference numbers this week or next. You may call to schedule an appointment or come in during our walk-in hours - Monday through Thursday 8:30am to 5:00pm (please arrive by 4:30pm). We will begin seeing students on a walk-in only basis starting [date].

We hope to hear from you soon.