FACULTY ENVIRONMENTS, PSYCHOSOCIAL DISPOSITIONS, AND THE ACADEMIC ACHIEVEMENT OF COLLEGE STUDENTS

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Postsecondary institutions seek to create a pedagogical environment that increases students' knowledge, expands their powers of reasoning, and shapes their psychosocial dispositions. In this study, we examined a conceptual model of academic attainment including two aspects of the pedagogical environment experienced by students, namely the cognitive demands set by professors and the social support provided by both professors and other students. Along with these climate variables, three psychosocial dispositions of students, self-esteem, perceived academic control, and coping strategies, were also included. A sample of 854 undergraduate students in the faculties of Arts and Science from a mid-western Research-1 (Canadian) university was used to estimate the effect parameters in the model. The results suggest that both cognitive demands and social support affected the students' perceived academic control and coping strategies. In turn, the pedagogical environment and the psychosocial dispositions affected the students' academic achievement. Implications for establishing and maintaining supportive pedagogical environments and for helping students improve their perceived control and coping strategies are discussed.

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INTRODUCTION

For several decades human capital theory (Becker, 1975; Schultz, 1961) has provided an important conceptual framework for models of

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educational attainment, particularly in the analysis of the academic achievement of college students (Kerckhoff, 2001). In this connection, Bidwell (1989) argues that postsecondary institutions are important for the creation of human capital in three ways: first, they increase the knowledge that students have in their chosen disciplines; second, they expand the reasoning and critical thinking of students far beyond that developed in specific disciplines; and finally, they shape the psychosocial dispositions critical to students' academic development. In addition, human capital theory posits that students use their knowledge, their power of reasoning and critical thinking, and their psychosocial dispositions to obtain better occupations, increase their incomes, and to advance socially.

In knowledge-based economies the cultivation of human capital through postsecondary education serves both individual and collective interests. Accordingly, the relationship between postsecondary achievement and future success has been the objective of considerable research. Typically, correlations between educational attainment and occupational status range from 0.5 to 0.7, and correlations between education and income range from 0.3 to 0.4 (Asherfelter and Krueger, 1994; Krymkowski, 1991). In other words, when relevant variables are controlled, students who complete a 4-year college degree, in comparison to those who finish secondary school, have net average increases of 30% to 40% in occupational status and from 20% to 40% in income (e.g., Pascarella and Terenzini, 1991).

Of course, models that predict the academic achievement of college students reflect only part of the human capital theoretical framework, and the model used in this study is no exception. Nevertheless, our model makes three unique contributions. First, the model includes two critical aspects of pedagogical environments in most postsecondary faculties: cognitive demand and social support, both of which are typically considered important though not explicitly recognized as part of the established curriculum. Cognitive demand represents the performance expectations that professors communicate to students, while social support represents the encouragement, academic and otherwise, provided by both students and professors concerning course-related tasks and activities (Clifton, Etcheverry, Hasinoff, and Roberts, 1996; Roberts and Clifton, 1992). Through organizational policies and priorities, colleges, and perhaps even faculties, construct educational environments that are designed to transmit academic skills and content knowledge through varying both the cognitive demands that are placed on students and the social support that is provided (Clifton, 1997; Clifton and Roberts, 1993).

Phelan (1979) and Tinto (1985) have suggested that high intellectual demands, coupled with positive social interaction with professors and other students, increase students' social and academic integration into college,

which in turn encourage them to successfully complete their degrees. Furthermore, Noel (1985) has argued that the demanding and caring attitudes by professors are important for the success of college students. Simply put, supportive interaction with professors, both in and out of the classroom, is instrumental to college students' academic achievement. In this respect, Clifton (1997) and Etcheverry, Clifton, and Roberts (2001) demonstrate that low cognitive challenges and/or little social support from both professors and other students negatively affect students' academic achievement. Because we assume that academic programs and environments vary, we examined the effects of these variables in the faculties of Arts and Science, two large and central faculties in most colleges.

A second distinctive feature of our model is the inclusion of three psychosocial dispositions that students bring with them when they enroll in college programs, namely self-esteem, perceived academic control, and coping strategies. These psychosocial dispositions are conceptualized as being relatively stable, trait-like attributes presumed to influence scholastic achievement in a variety of ways (Perry, 1991, 2003). While these attributes have been considered in school children (e.g., Ross and Broh, 2000; Wentzel and Wigfield, 1998), they have not been widely adopted by researchers studying postsecondary institutions. In fact, existing research on the scholastic attainment of college students places greater emphasis on demographic, institutional, and program variables to the general exclusion of psychosocial variables (e.g., Pascarella and Terenzini, 1991; Tinto, 1985).

The final distinctive feature of this project concerns the placement of the three psychosocial variables. In our model, these variables are presumed to intervene between faculty-based academic programs and environmental variables and the students' subsequent academic achievement. Surprisingly, researchers have not examined the direct and the indirect effects of demographic, program, and environmental variables on students' academic achievement to determine the degree to which they are mediated by the students' psychosocial dispositions. Although considerable literature has identified the cognitive demands and social support that are important for students' academic and economic success (Astin, 1993; Bidwell, 1989; Clifton, 1997; Etcheverry et al., 2001; Pascarella and Terenzini, 1991; Tinto, 1985; Weidman, 1989), little research has empirically assessed the relative effects of these variables, as mediated by the students' psychosocial dispositions, on their academic success.

A CONCEPTUAL MODEL OF ACADEMIC ACHIEVEMENT

A basic assumption underlying our model is that both colleges and students are rational actors. Colleges do not conscript students in the same

way that elementary and secondary schools do; rather, students and colleges choose each other with considerable deliberation. As such, college students continuously and consciously assess the quality of their educational experiences in relation to the academic, economic, and social rewards they expect to receive later in life. Nevertheless, between 10% and 50% of students who begin postsecondary programs do not complete college degrees (Cuseo, 1991; Lewington, 1996). This disparity clearly suggests that postsecondary institutions need to focus on admitting students who have the intellectual and psychosocial dispositions to succeed and they also need to provide pedagogical environments that foster continued success for the selected students.

In the model tested here (see Figure 1), critical exogenous variables are represented by the demographic background of students, their academic program, as well as the cognitive demands and social support they experience in the pedagogical environments in the faculties of Arts and Science. The demographic background variables include gender, age, and educational resources, and the academic program variables include year of college, credit hours, and faculty. The cognitive demands are defined by the expectations and aspirations professors direct at students to comprehend information and to evaluate arguments. The social support, in turn, is defined by the encouragement that students receive from both other students and professors (Szafran, 2001). Next, the students' psychosocial dispositions and their academic achievement are included as key endogenous variables. The students' psychosocial dispositions are represented by self-esteem, perceived academic control, and coping strategies. Finally, academic achievement is assessed using students' self-reported cumulative grade point averages (GPAs).

This study has an important limitation because the model does not include the academic achievement of the students when they first enrolled in the college. In the US, it is common for colleges to use standardized exams (e.g., SATs) as part of their admission procedures, but in Canada these exams are rarely, if ever, used. Consequently, our model is misspecified and the effects of the exogenous variables we have included may be inflated. Future research should, of course, include standardized exam results as an additional exogenous variable. Nevertheless, the conceptual model follows conventions established in the empirical literature and assumes that the causal relationships between the exogenous and endogenous variables are unidirectional, an assumption that is not likely to bias our estimates of the effect parameters other than the unknown effects resulting from the misspecification (e.g., Astin, 1993; Pascarella and Terenzini, 1991).
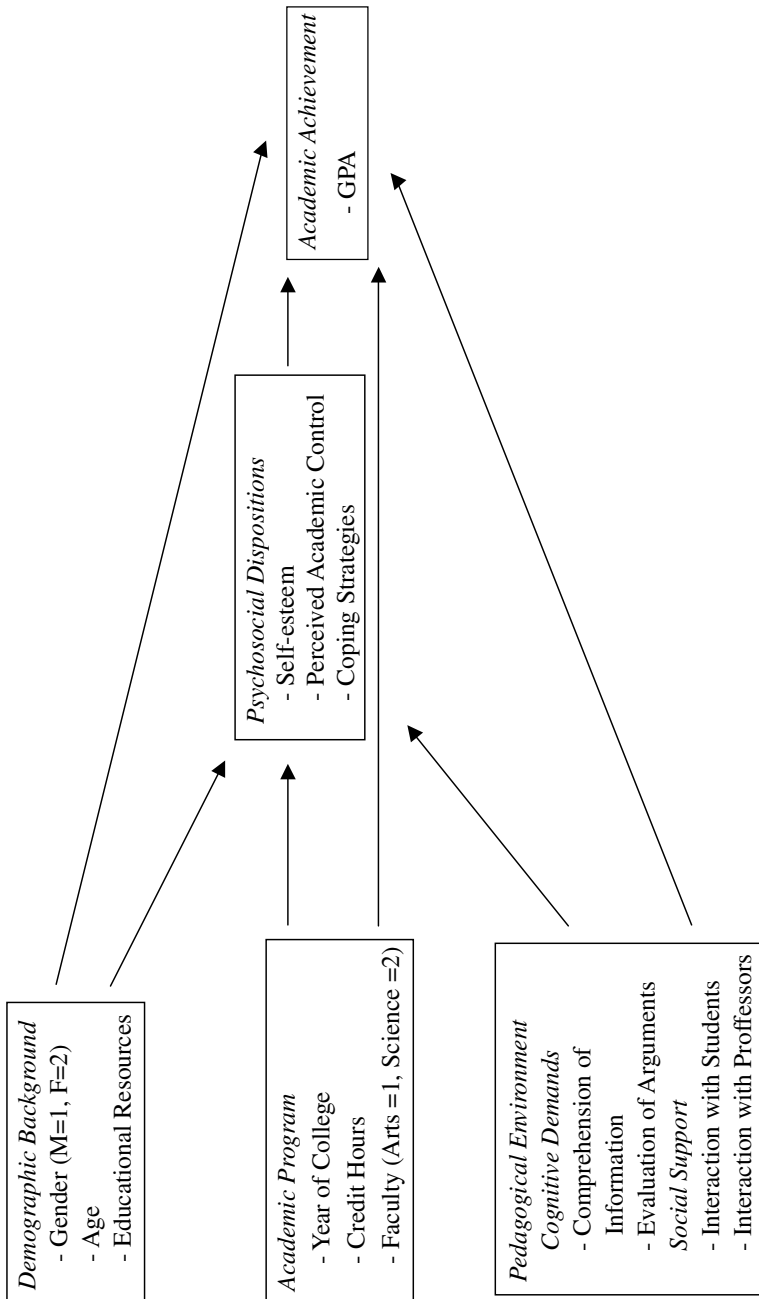
FIG. 1. The conceptual model.

Demographic, Program, and Environmental (Exogenous) Variables

In the model examined in this study, the variables of specific interest are the cognitive demands and the social support students experience in their academic programs. Previous empirical work illustrates that the cognitive challenges that students experience can be represented by two variables, comprehension of information and evaluation of arguments (Clifton et al., 1996). Using Bloom's taxonomy of educational objectives (Bloom, Engelhart, Furst, Hill, and Krathwohl, 1956), comprehension of information refers to knowing and understanding basic ideas, the two lower levels in the taxonomy, and evaluation of arguments refers to applying, analyzing, synthesizing, and assessing ideas and arguments, the four higher levels. As such, the concepts of comprehension and evaluation encapsulate the entire spectrum of Bloom's taxonomy. Previous empirical work also illustrates that the social support college students receive is best understood by considering the interaction they have with other students and their interaction with professors (Roberts and Clifton, 1992).

The three demographic background characteristics of students specified in our model, namely gender, age, and educational resources, have all been shown to influence students' psychosocial dispositions and their academic achievement. There is a growing body of evidence that female students have more positive psychosocial dispositions and higher GPAs than males (Astin, 1993; Clifton, 1997; Conley, 2001; Etcheverry et al., 2001). Students' age also influences a number of psychosocial variables, including self-esteem, perceived academic control, and coping strategies (Clifton, 1997; Conley, 2001; Pascarella, Edison, Hagedorn, Nora, and Terenzini, 1996; Perry, 1991; Robson Crump, Hickson, and Laman, 1985; Sigmon, Stanton, and Snyder, 1995), as well as affecting their academic achievement (Clifton, 1997; Conley, 2001; Etcheverry et al., 2001; Kuh, 1995; Perry, Hladkyj, Pekrun, and Pelletier, 2001; Ting and Robinson, 1998). Because age nominally represents the sum of the students' life experiences, it is likely to have positive effects on both the psychosocial and achievement variables. Older, and generally more mature, students, in comparison with younger ones, have likely learned to cope more effectively with difficult situations, to overcome such difficulties, and to adapt both academically and socially to college and faculty environments (e.g., Wheaton, 1980).

Existing research shows mixed effects concerning the relationship between the educational resources of families and college students' academic achievement. Etcheverry et al. (2001), for example, found that the educational resources of students' parents did not relate to their

academic achievement, while a number of other researchers have found that students with less educated parents were more likely to drop out of college than students with more highly educated parents (Astin, 1975, 1985; Conley, 2001; Ting and Robinson, 1998). In all likelihood, well-educated parents instill academically adaptive psychosocial dispositions in their children, while at the same time ensuring that they learn effective academic and life skills, not to mention providing the necessary financial resources for their children's education. Consequently, we predicted that students with well-educated parents will be more successful academically than students with less-educated parents (Mirowsky and Ross, 1998). We could not predict whether the education resources of parents directly affect their children's academic achievement or if the effects are mediated by the psychosocial variables. Nevertheless, we examined both the direct and indirect effects of the educational resources of parents on their children's academic achievement.

Previous research indicates that formal academic program variables affect students' psychosocial dispositions and academic achievement, such as the faculty in which students are enrolled, the number of courses they take, and their year of college (Hativa and Marincovich, 1995; Szafran, 2001). The two faculties in which students were registered, Arts and Science, define basic disciplinary differences common in most colleges, and were assumed to create significant variation in the cognitive demands and the social support experienced by students (Menec and Perry, 1995; Szafran, 2001). Credit hours and the students' year of college, in turn, represent their commitment to education. Thus, increased commitment to a discipline is represented by students being enrolled in more credit hours and by being registered in more senior courses. This assumes that highly committed students are more likely to be enrolled full-time even if they work part-time, and are less likely to drop out before completing their degrees. Consequently, we expected both course load and years of college to positively influence the students' psychosocial dispositions and achievement (Astin, 1985; Pascarella et al., 1996; Pascarella and Terenzini, 1991; Ting and Robinson, 1998). Preliminary analyses using these data suggest that the cognitive demands and social support of professors are not affected, to any significant degree, by students' demographic and academic program variables. Based on this evidence, the faculty environment variables were considered exogenous as are the demographic and program variables.

Psychosocial (Endogenous) Variables

Both social cognition theory and empirical research suggest that individual differences in psychosocial dispositions, the endogenous

(mediating) variables in our model, play a major role in students' academic achievement (e.g., Bandura, 1997; Fiske and Taylor, 1991; Weiner, 1986, 1995). In particular, a number of studies show that students with high self-esteem perform better academically than students with low self-esteem (Craparo, Hines, and Kayson, 1981; Liu, Kaplan, and Risser, 1992). Considering these findings, and with substantial pressure from stakeholders, many colleges have implemented a variety of programs aimed at improving the self-esteem of college students (e.g., Covington, 1992, 2000; Hersey and Blanchard, 1993). Another critical psychosocial variable affecting students' adaptation to college is perceived academic control, namely the degree to which they believe they can influence and predict their own academic success. Students with higher perceived academic control are more likely to engage in specific behavior that lead to greater academic success than those with lower perceived academic control (Perry, 1991). In fact, Perry and his colleagues have systematically shown, in both controlled laboratory experiments (Schonwetter, Perry, and Struthers, 1993) and longitudinal field studies (Perry et al., 2001), that high-control students consistently outperform their low-control colleagues (Perry, 2003).

In addition to having higher academic control, some students employ specific coping strategies in striving to improve their academic performance. In this respect, Struthers, Perry, and Menec (2000) demonstrate that using problem-focused coping strategies have positive effects on college students' academic achievement, whereas using emotion-focused strategies do not. Recognizing this, Perry and his colleagues have developed ''control-enhancing'' programs for teaching college students to cope more effectively with high cognitive demands and with professors who provide little social support (e.g., Menec, Perry, Struthers, Schonwetter, Hechter, and Eichholz, 1994; Perry and Magnusson, 1987, 1989; Perry and Penner, 1990; Perry and Tunna, 1988). Interestingly, Ross and Broh (2000) found that when perceived academic control and self-esteem of high school students were examined in the same model, the apparent influence of self-esteem on academic achievement was explained entirely by perceived academic control. In view of the potential importance of these psychosocial variables for college students' academic development, the relative effects of perceived academic control, coping strategies, and self-esteem on academic performance require further exploration.

Even though these three psychosocial variables are assumed to be relatively stable by the time students enter college (Gottfried, Fleming, and Gottfried, 2001; Stipek and Weisz, 1981), it is reasonable to assume that they can be influenced, at least to some extent, by the pedagogical environment in the students' faculty. Obviously, the faculty-based intervention programs

for weak students are designed specifically to help them adjust to the normal faculty-based academic demands and social responsibilities. For this reason, the cognitive demands and the social support variables in our model are assumed to affect the psychosocial variables. In fact, Perry (1991, 2003) argues that pedagogical environments affect students' psychosocial dispositions and their academic achievement through the ways in which disciplinary knowledge is presented. Having students write unannounced tests and listen to poorly organized lectures, for example, have wide-ranging and negative effects on both their psychosocial dispositions and their academic achievement. Overall, such practices generally encompass the demands professors place on students as well as the positive and negative interactions students have with both professors and other students (Kuh, 1995; Perry and Magnusson, 1987, 1989; Perry and Penner, 1990; Szafran, 2001). As a consequence, we expect that the faculty environment variables have important effects even when the demographic and academic program variables are controlled.

METHOD

Sample

The students were selected from the faculties of Arts and Science at a large, mid-western, Research-1 (Canadian), university. At that time, 9092 students were enrolled in these two faculties: approximately 60% in Arts and 40% in Science. Near the end of the academic year (March), questionnaires with covering letters explaining the study were mailed to a random sample of 1000 students drawn from each of the two faculties. As an incentive, students who returned their questionnaires within one month were eligible to win a $350.00 (Cnd.) gift certificate from the university bookstore. Of the initial 2000 questionnaires mailed out, 864 completed questionnaires were returned and 113 questionnaires were returned because of incorrect mailing addresses. The response rate, excluding the incorrectly addressed envelopes, was approximately 46%. The sample included 425 Arts students and 429 Science students. Ten students reported being registered in other faculties and were dropped from the analyses (n = 854).

Variables in the Model

Descriptive statistics on the 14 variables used to test our model are presented in Table 1. The exogenous variables are the demographic background variables (age, gender, and educational resources), academic program variables (year, credit hours, and faculty), and the pedagogical

TABLE 1. Summary of Variables

Measures	Number of Items	Theoretical Ranges	Actual Range	Inter-item correlations	Factor loadings	Alpha	M	SD
Gender	1	1 = male 2 = female	n/a	n/a	n/a	n/a	n/a	n/a
Age	1	open ended	17–30	n/a	n/a	n/a	21.68	3.54
Educational Resources	2	2 = both parents elementary school 18 = both parents graduate degree	2–18	n/a	n/a	n/a	9.46	4.19
Year of College	1	open ended	0–5	n/a	n/a	n/a	2.11	1.4
Credit hours	1	open ended	3–33	n/a	n/a	n/a	21.92	8.27
Faculty	1	1 = Arts 2 = Science	n/a	n/a	n/a	n/a	n/a	n/a
Comprehension of Information	6	1 = strongly disagree 4 = strongly agree	8–24	.317–.799	.594–.859	.86	19.55	3.00
Evaluation of Arguments	11	1 = strongly disagree 4 = strongly agree	12–44	.059–.568	.510–.715	.84	30.96	4.94
Interaction with Students	5	1 = strongly disagree 4 = strongly agree	6–20	.303–.510	.655–.769	.75	14.01	2.26
Interaction with Professors	9	1 = strongly disagree 4 = strongly agree	11–36	.155–.623	.378–.767	.85	25.60	3.66
Self-esteem	10	1 = strongly disagree 4 = strongly agree	11–40	.256–.757	.643–.837	.90	31.34	5.24
Perceived Academic Control	10	1 = strongly disagree 4 = strongly agree	19–37	.124–.557	.379–.745	.69	31.35	3.27
Coping Strategies	10	1 = not at all 5 = a great deal	14–50	–.030–.813	.361–.694	.75	32.93	6.56
Academic achievement	1	1 = 0.0–0.9 8 = 4.0–4.5	1.0–4.5	n/a	n/a	n/a	3.72	1.31

environment variables (cognitive demands and social support). The endogenous variables are the three psychosocial variables (self-esteem, perceived academic control, and coping strategies) intervening between the effects of the exogenous variables and the students' academic achievement (cumulative GPA).

Demographic Background

The demographic background of the students was defined in terms of gender, age, and educational resources. Gender was treated as a dummy variable with the males coded as "1" and the females coded as "2." There were 385 (45%) males and 469 (55%) females, a distribution that reflected the undergraduate student population in the two faculties during the 1996–1997 academic year. Originally, the data for age was positively skewed and was recoded to normalize the distribution, while retaining the natural distribution of ages. Students who were 17 and 18 were recoded as "18;" students who were 23 and 24 were recoded as "23;" students who were between 25 and 29 were recoded as "25;" and students who were 30 years of age and older were recoded as "30." Educational resources reflect the amount of education attained by the students' parents (1 = completed elementary school and 9 = completed a graduate degree). The education levels of both parents were summed and the scores ranged from 2 to 18.

Academic Program

Three academic program variables included the students' year of college, credit hours, and faculty. Year of college was measured by asking the students:"How many years of university education have you completed? (If you have been a part-time student, then estimate the number of equivalent full-time years.)" The data were recoded so that students with 5 or more years of college were given a score of "5." The mean was 2.11 years of college and the range was from 0 to 5. Credit hours indicated the hours of course work that students were taking during the academic year in which the study was conducted. The data were coded into 3 credit hour blocks, a distinction used for administrative purposes in these two faculties. Thus, credit hours ranged from 3 to 33 hours and the mean is 21.92 hours, with approximately 75% of the students enrolled in 18 credit hours or more, which is considered as full-time. Finally, students enrolled in the Faculty of Arts were coded as "1" and those enrolled in the Faculty of Science were coded as "2."

Pedagogical Environment

The pedagogical environment was defined in terms of two variables measuring the cognitive demands placed on students and two variables assessing the social support students received in the academic programs offered by the faculties of Arts and Science. The cognitive demands placed on students were assessed by the focus professors gave to the students' comprehension of information and evaluation of arguments. The students' comprehension of information was assessed on a 6-item Likert scale relating to the challenges they experienced in remembering and interpreting new facts and terms using statements like "I have been challenged to:" "remember an extensive number of new terms" and "interpret the meaning of new facts and terms" (Clifton et al., 1996). Higher scores represent the students' perceptions of being challenged more often to comprehend and interpret new information. In turn, evaluation of arguments was measured on an 11-item Likert scale assessing the students' perceptions of being challenged to apply, analyze, synthesize, and evaluate arguments on statements like "I have been challenged to:" "demonstrate how theories are useful in real life" and "identify the strengths and weakness of arguments" (Clifton et al., 1996). Higher scores represented greater challenges to apply and evaluate arguments.

The social support that students experienced in their faculties was derived from two variables, interaction with students and interaction with professors. Interaction with students was assessed on a 5-item Likert scale in which students were asked to respond to statements such as "I find it easy to get to know other students" and "Others students accept me as I am" (Roberts and Clifton, 1992). Interaction with professors was assessed on a 9-item Likert scale in which students were asked to respond to statements such as "Professors care about what I think" and "Professors help me do my best" (Roberts and Clifton, 1992). Higher scores on both variables represented greater support students received from fellow students and professors.

Psychosocial Dispositions

The first set of endogenous variables are the students' psychosocial dispositions: self-esteem, perceived academic control, and coping strategies. Self-esteem was determined on a 10-item Likert scale that required students to indicate their agreement with statements such as "I feel that I have a number of good qualities" and "I feel I do not have much to be proud of" (Rosenberg, 1989). Perceived academic control was derived from a 10-item Likert scale that assessed students' agreement with

statements such as "I have a great deal of control over my academic performance in my courses" and "No matter what I do, I can't seem to do well in my courses" (Perry et al., 2001). Students' coping strategies was determined from a 10-item Likert scale that assessed the extent to which students engaged in specific behaviors after having done poorly in a college course such as "I try a different study strategy" and "I routinely review my notes after class" (Struthers et al., 2000). For all three scales, negatively worded items were reverse coded.

Academic Achievement

The final dependent variable was the students' self-reported and cumulative GPA based on eight response options (1 = 0.0–0.9 to 8 = 4.0–4.5). As expected, no students reported GPAs between 0 and 0.9; the next two lowest categories, "1.0–1.4" and "1.5–1.9," had few responses and were combined into a single category, coded as "3," to normalize the distribution. The mean rating using this modified scale is 3.72, which translates into an average GPA of between 2.5 and 2.9. Self-reported GPAs are generally very reliable measures of students' actual academic achievement with correlations ranging from .76 to .91 (Frucot and Cook, 1994; Goldman, Flake, and Matheson, 1990; Zimmerman, Caldwell, and Bernat, 2002).

RESULTS

Rationale for the Analyses

Structural equation modeling (SEM) procedures were used to test the causal relationships between the exogenous and endogenous variables in our model (Tabachnick and Fidell, 2001). These procedures allowed us to examine the influence of the three sets of exogenous variables, namely the demographic background (gender, age, and educational resources), academic program (year of college, credit hours, and faculty), and the pedagogical environments (cognitive demands and social support) on the students' psychosocial dispositions (self-esteem, perceived academic control, and coping strategies) and their academic achievement (cumulative GPA). In addition, the SEM procedures enable us to examine the mediating (indirect) effects of the exogenous variables, particularly the academic program and faculty environment variables via the psychosocial dispositions, on the students' academic achievement.

Before conducting the analyses, an examination of the variables for normality and homoscedasticity indicated that none of the variables violated

these basic assumptions. Correlation coefficients were computed, and standardized regression coefficients were then calculated following the logic of the conceptual model. Collinearity, a problem that usually arises when independent variables are highly correlated (e.g., 0.8–0.9), was also assessed. Variance inflation factor coefficients (VIF) were calculated for each exogenous variable on each endogenous variable in the model. As expected, none of the VIF coefficients were large enough to indicate that collinearity was a problem (Neter, Kutner, Nachtsheim, and Wasserman, 1996).

Zero-Order Relationships

Table 2 presents the zero-order correlation coefficients between the fourteen variables in the model. GPA, the final endogenous variable, is significantly correlated with all the other variables except for gender and faculty. Not surprisingly, GPA is most highly correlated with the three psychosocial variables, perceived academic control (.324), coping strategies (.301), and self-esteem (.196), with the two social support variables, interaction with professors (.283), interaction with students (.171), and with the educational resources of the students' parents (.175). Interestingly, the correlation between academic control and GPA is substantially higher than the correlation between self-esteem and GPA. In fact, the correlations between academic control and other variables in the model are consistently higher than the correlations between self-esteem and the same variables, suggesting a potentially significant difference between academic control and self-esteem in understanding and predicting the academic development of college students. These correlations are roughly consistent with Ross and Broh's (2000) results for high school students.

In examining the intervening variables, both levels of cognitive demands, comprehension of information and evaluation of arguments, correlate with the three endogenous psychosocial variables, self-esteem (.139 and .235), perceived academic control (.165 and .263), and coping strategies (.158 and .272). As expected, the higher level of cognitive demands (evaluating arguments) is more strongly correlated with each of the psychosocial variables than the lower level (comprehension of information). The social support variables (interaction with students and interaction with professors) are also correlated with the three psychosocial variables, self-esteem (.378 and .268), perceived academic control (.231 and .443), and coping strategies (.288 and .230). Surprisingly, the two social support variables are inconsistently related to the psychosocial variables.

In addition, Arts and Science faculties are quite different, as illustrated by the correlations between Faculty and the other variables in the model. Compared with Arts students, Science students are more likely to be

TABLE 2. Correlation Coefficients for Variables in the Model

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.	1.00													
2.	-.126**	1.00												
3.	.033	-.248**	1.00											
4.	-.055	.453**	.017	1.00										
5.	.073*	-.481**	.220**	-.209**	1.00									
6.	-.130**	-.263**	.088*	-.004	.191**	1.00								
7.	.110**	-.079*	-.032	.009	.166**	.173**	1.00							
8.	.090**	.104**	-.046	.108**	.050	-.161**	.353**	1.00						
9.	.058	-.073*	.006	.030	.149**	.094**	.226**	.356**	1.00					
10.	.039	.152**	.000	.067	.014	-.146***	.102**	.429**	.355**	1.00				
11.	-.040	.112**	-.061	.075*	-.048	-.052	.139**	.235**	.378**	.268**	1.00			
12.	.030	.070*	.042	.060	-.011	-.033	.165**	.263**	.231**	.443**	.373**	1.00		
13.	.271**	.111**	-.040	-.007	-.001	-.076*	.158**	.272**	.288**	.230**	.364**	.278**	1.00	
14.	.037	.072*	.175**	.098**	.111**	.060	.037	.082*	.171**	.283*	.196**	.324**	.301**	1.00
Means	1.55	21.68	9.46	2.11	21.92	1.50	19.55	30.96	14.01	25.60	31.34	31.35	32.93	3.72
Standard Deviation	0.50	3.54	4.19	1.40	8.27	0.50	3.00	4.94	2.26	3.66	5.24	3.27	6.56	1.31

Notes: 1 = Gender; 2 = Age; 3 = Educational Resources; 4 = Year of College; 5 = Credit Hours; 6 = Faculty; 7 = Comprehension of Information; 8 = Evaluation of Arguments; 9 = Interaction with Students; 10 = Interaction with Professors; 11 = Self-esteem; 12 = Perceived Academic Control; 13 = Coping Strategies; 14 = GPA; $^*p \leq .05$; $^{**}p \leq .01$.

young males who were enrolled in more credit hours of course work, who interacted more often with other students and less often with professors, and who reported slightly higher GPAs. Less important, age is correlated with faculty ($-.263$) and self-esteem ($.112$), and both gender and age are correlated with coping strategies ($.271$ and $.111$ respectively). While the information in Table 2 is informative, the correlation coefficients need further elaboration through the application of the SEM procedures.

Multivariate Analyses of the Psychosocial Dispositions

The first set of SEM analyses, presented in Table 3, examines the effects of the demographic background (gender, age, and educational resources), academic program (year of college, credit hours, and faculty), cognitive demands (comprehension of information and evaluation of arguments), and social support (interaction with students and interaction with professors) variables on the three psychosocial variables (self-esteem, perceived academic control, and coping strategies). The cognitive demands

TABLE 3. Standardized Regression Coefficients and R^2 for the Psychosocial Variables

Independent Variables	Self-esteem	Perceived Academic Control	Coping Strategies
Demographic Background			
Gender	−.084*	.006	.261***
Age	.038	.030	.167***
Educational Resources	−.012	.062	−.005
Academic Program			
Year of College	.029	.008	−.080*
Credit Hours	−.048	−.030	.016
Faculty	.006	.052	.020
Cognitive Demands			
Comprehension of Information	.049	.097**	.047
Evaluation of Arguments	.048	.047	.124**
Social Support			
Interaction with Students	.338***	.087*	.214***
Interaction with Professors	.108**	.366***	.053
R^2	.175	.196	.195

*$p \leq .05$; **$p \leq .01$; ***$p \leq .001$.

and the social support variables have the largest effects on the students' psychosocial dispositions. Self-esteem is strongly affected by both the students' interaction with other students (.338) and by their interaction with professors (.108). Of note is that the interactions students have with other students has over three times the impact on their self-esteem as the students' interaction with their professors, raising questions about the roles of significant others in the psychosocial development of students. Some researchers argue that instructors serve an active role while others argue that peers are more important (e.g., Astin, 1993; Pascarella and Terenzini, 1991; Weidman, 1989). Gender also has a significant effect on the self-esteem of students (−.084) indicating that males have slightly higher scores than females. Overall, these results are not surprising in showing that the students' self-esteem is particularly sensitive to interactions with peers and the support they receive from professors.

Also, it is not surprising that the strongest effects on perceived academic control are from the students' interaction with professors (.366) and comprehension of information (.097), the later representing the lowest level of cognitive demands that students receive. Significantly, student–professor interaction has a considerable impact on enhancing students' academic control relative to their understanding of course material. In addition, interaction with other students has a positive, but smaller, effect on perceived academic control (.087). In essence, it appears that support from professors and taking courses that are less demanding (constructed at the knowledge and comprehension levels in Bloom's taxonomy) give students a greater sense of academic control than interacting with other students and taking more difficult courses. These results are consistent with the emerging literature on control-enhancing strategies used by students in postsecondary institutions (Perry, 1991, 2003; Perry and Penner, 1990).

The final psychosocial variable, coping strategies, represents the ability of students to adjust their behavior to meet the academic demands of college. Gender (.261) has the strongest effect on coping strategies, implying that females have better coping strategies than males. Both interaction with students (.214) and evaluation of arguments (.124), the higher cognitive demands in Bloom's taxonomy, have positive effects on the students' coping strategies. These effects suggest that students who cooperate with each other and who are in courses where they are required to analyze and evaluate arguments have better coping strategies than students who work independently and are in courses in which they are only required to comprehend information. Finally, older students have more positive coping strategies than younger students (.167) suggesting that maturity helps students cope

with the academic demands of college work. At the same time, year of college has a small negative effect on coping strategies ($-.080$), suggesting that even though students increase their coping strategies with age and maturity, the difficulty of courses probably increase year by year resulting in this small decrease in their perceived coping strategies.

Three variables, educational resources, credit hours, and faculty, have virtually no effects on the psychosocial dispositions of the students. This is surprising because it was expected that some of these variables would affect students' psychosocial dispositions. Specifically, we expected that year of college would affect the students' self-esteem and that faculty would affect their coping strategies. Nevertheless, the 10 exogenous variables explained between 17.5% and 19.6% of the variance in the three psychosocial variables. The strength of these relationships suggest that the pedagogical environment and the psychosocial dispositions variables, in turn, will have important effects on the students' cumulative GPAs.

Multivariate Analyses of Academic Achievement

In Table 4, both reduced-form coefficients (Step 1) and fully-recursive coefficients (Step 2) are presented for the GPAs of the students. Net of the independent and intervening variables (Step 2), coping strategies (.243) has the largest effect on the students' GPAs, with slightly smaller effects resulting from perceived academic control (.199), interaction with professors (.172), and educational resources (.158). Interaction with other students, however, has virtually no effect on the students' GPAs ($-.005$). The number of credit hours in which students are enrolled (.166) and their year of college (.077) also have positive effects on their GPAs. Previously we argued that both of these variables represent, in part, the commitment students make to their college education, and consequently these effects suggest that students with greater commitment have higher GPAs. Overall, the results suggest that the cumulative GPAs students receive are largely affected by their own psychosocial dispositions related to academic work, particularly by their perceived academic control and their coping strategies, and by the positive interaction they have with their professors but not with the interaction they have with other students.

Not surprisingly, the cognitive level at which professors' deliver courses also affect the students' cumulative GPAs. Specifically, evaluation of arguments ($-.109$), the highest level of cognitive demands in Bloom's taxonomy, has a significant negative effect while comprehension of information ($-.039$), the lowest level of cognitive demands, has virtually no effect. Together, these results suggest that students have more difficulty

TABLE 4. Standardized Regression Coefficients and R^2 s for the Reduced-form and Fully-Recursive Models for Grade Point Average

Independent Variables	Grade Point Average	
	Step 1	Step 2
Demographic Background		
Gender	.058	−.005
Age	.119**	.075
Educational Resources	.162***	.158***
Academic Program		
Year of College	.070	.077*
Credit Hours	.154***	.166***
Faculty	.043	.027
Cognitive Demands		
Comprehension of Information	−.006	−.039
Evaluation of Arguments	−.074	−.109**
Social Support		
Interaction with Students	.081*	−.005
Interaction with Professors	.268***	.172***
Psychosocial		
Self-esteem		.023
Perceived Academic Control		.199***
Coping Strategies		.243***
R^2	.138	.232

*$p \leq .05$; **$p \leq .01$; ***$p \leq .001$.

obtaining high GPAs in more demanding courses. Supporting this interpretation is the evidence that the effect of evaluating arguments is much larger when the psychosocial variables are included in the analyses than when they are not included (−.109 in Step 2 compared with −.074 in Step 1). Thus, perceived academic control and coping strategies, but not self-esteem, suppress the relationship between evaluation of arguments and GPAs. This finding suggests that students with more highly developed control and coping strategies are better able to deal with courses that require the evaluation of arguments. Finally, GPA is virtually unaffected by the students' gender (−.005), faculty (.027), interaction with other students (−.005), and self-esteem (.023). The results for interaction with other students and self-esteem are, in fact, surprising because the correlation coefficients are substantial (.171 and .196 respectively).

These analyses allow us to examine the indirect effects of the exogenous variables on GPAs by subtracting the relevant coefficients in Step 2 from those in Step 1. As expected, the largest indirect effects on GPAs result from the social support variables as mediated by the psychosocial variables. Specifically, more than one-third of the effect of interaction with professors ($.268 - .172 = .096$) and virtually all of the effect of interaction with students ($.081 - (-.005) = .086$) is mediated by the psychosocial variables. In both cases, coping strategies (.243) and perceived academic control (.199) have much larger mediating effects than self-esteem (.023). The effects of the cognitive demands as mediated by the psychosocial variables are, however, quite small: .033 for the comprehension of information and .035 for the evaluation of arguments. Nevertheless, more than 35% of the effect of age ($.119 - .075 = .044$) is mediated by the psychosocial variables suggesting that older students, in comparison with younger students, do better in college because their perceived academic control and coping strategies are much better developed. These results suggest, once again, that older students are generally more mature than younger students and, in part, they obtain slightly higher cumulative GPAs because of their psychosocial dispositions.

In total, the amount of variance explained in the students' GPAs in Step 1 is 13.8%, which increased substantially to 23.2% in Step 2 when the psychosocial variables are included. The increase in explained variance, 9.4%, also shows that the psychosocial dispositions of students, specifically their academic control and coping strategies, have very significant effects on their cumulative GPAs even when the demographic background, academic program, and pedagogical environment variables are controlled. Moreover, the evidence suggests that the social support students receive from professors, but not from other students, have significant effects on their cumulative GPAs even when the other exogenous variables are controlled.

DISCUSSION

The research problem examined here can be understood from the viewpoint of human capital theory (Becker, 1975; Schultz, 1961). Researchers such as Bidwell (1989) and Kerckhoff (2001) have noted that colleges shape students' psychosocial dispositions, increase their academic achievement, and prepare them for their intellectual and social lives outside of college. But, on the one hand there has been little research assessing the effects of the pedagogical environment students encounter in college on their psychosocial dispositions, particularly their self-esteem,

academic control, and coping strategies. There has, on the other hand, been considerable research on the way the psychosocial dispositions affect the students' academic achievement, but the mediating effect of the pedagogical environment via the students' psychosocial dispositions has not been examined. In this study, we anticipated that two aspects of the pedagogical environment, the cognitive demands and the social support experienced by students, to influence their psychosocial dispositions and their academic achievement. Cognitive demands are the expectations that professors communicate to students, while social support is the encouragement provided by both students and professors (Clifton, 1997; Clifton et al., 1996; Etcheverry et al., 2001; Noel, 1985; Phelan, 1979; Tinto, 1985).

Considerable research also shows that some psychosocial dispositions, particularly self-esteem, academic control, and coping strategies, are more important than a number of other variables in affecting the students' academic achievement (Perry, 1991, 2003; Ross and Broh, 2000; Wentzel and Wigfield, 1998). In this research, self-esteem represents the students' conception of themselves as students (Rosenberg, 1989); perceived academic control represents the degree to which students believe that they can influence their academic success (Perry, 1991, 2003); and coping strategies represent the problem-focused procedures students use when they perform below their expectations (Struthers et al., 2000). Even though these psychosocial dispositions are assumed to be relatively stable by the time students enter college, they may be affected, to a certain degree, by the pedagogical environments students encounter. Because we assumed that pedagogical environments vary across faculties, we assessed the impact of both the Arts and Science faculties on the psychosocial dispositions and the academic achievement of the students. For this reason we argue that the psychosocial dispositions intervene between the pedagogical environments, demographic variables, and academic programs, and the students' academic achievement.

The results show that some important aspects of the academic program, specifically credit hours and faculty, have virtually no effects on the three psychosocial dispositions of the students. Moreover, educational resources, measured as the amount of education that the students' parents had obtained, had virtually no effects on the psychosocial variables even though some literature, including our own previous study (Etcheverry et al., 2001), suggests that well-educated parents prepare their children, both psychosocially and academically, for college (Astin, 1975, 1985; Conley, 2001; Ting and Robinson, 1998). There is also increasing evidence that female students have more positive psychosocial dispositions in college than males (Astin, 1993; Clifton, 1997; Conley, 2001; Etcheverry

et al., 2001). Thus, it is not surprising that gender had significant effects on both self-esteem and coping strategies. These results suggest that males have significantly higher self-esteem scores but females have better coping strategies. In addition, there is also evidence that age has a relatively strong positive impact on coping strategies, suggesting that maturity helps students cope with academic work (Clifton, 1997; Conley, 2001; Pascarella et al., 1996; Robson Crump et al., 1985; Sigmon et al., 1995). But, for coping strategies the effect of age is offset to a small degree by the negative effect of years in college, suggesting that as students progress through college it is increasingly difficult for them to cope likely due to the increasingly demanding workloads of advanced courses. This interpretation is supported by the significant negative correlation between year of college and number of credit hours taken ($-.209$) suggesting that, in general, students take fewer courses as they progress in their academic programs.

More importantly, both the cognitive demands and the social support that students experience have relatively large effects on their psychosocial dispositions. Interestingly, the effects of the demands and the support vary across the psychosocial dispositions. Specifically, the interactions students have with other students and their comprehension of information (the lower level in Bloom's taxonomy) affect their perceived academic control. However, students' interaction with other students and their evaluation of arguments (the higher level in the taxonomy) were found to affect their coping strategies. These results suggest that students who perceive that their courses are less demanding have a better sense of academic control while those who perceive that they are taking more demanding courses have better coping strategies. Of course, the demands in courses are set by professors and not by students, so it seems reasonable that the effect of interacting with professors is substantially larger than the effect of interacting with other students on perceived academic control. Nevertheless, for both self-esteem and coping strategies, the interactions that students have with each other is more important than their interactions with professors.

In the final analysis, coping strategies and academic control had the largest effects on the students' academic achievement. Surprisingly, the effect of self-esteem on GPA is virtually zero even though the correlation coefficient between these two variables is positive and significant (.196). This evidence is similar to the evidence provided by Ross and Broh (2000) suggesting that academic achievement is affected by students' perceived control and coping strategies, but not by their self-esteem. Additionally, the interaction students have with their professors has a moderately strong positive effect on academic achievement with about one-third being

mediated by two of the three psychosocial dispositions, perceived academic control and coping strategies. Even though the total causal effect of interaction with other students is relatively small (.081), virtually all of it is mediated by these two psychosocial dispositions. These results support the argument that students improve their academic control and coping strategies by interacting with other students and that these two dispositions, in turn, affect their GPAs. Moreover, students who have more interaction with professors improve both their psychosocial dispositions and their grades with about one-third of the effect on GPAs being mediated by the psychosocial dispositions. In other words, interacting with professors helps students develop their academic control and coping strategies, which in turn improves their GPAs.

In total, our analyses suggest that by collaborating with other students, working and studying together, and by having positive interactions with professors, students can improve their academic performance. Complicating this interpretation in which the autonomy of students is highlighted, however, is that the cognitive level at which professors' set their courses also affects the students' grades. From the students' perspective, courses that are set at the higher level of cognitive demands, the evaluation of arguments, has a relatively strong negative effect on their GPAs, while courses that are set at the lower level, the comprehension of information, has virtually no effect. Not surprisingly, the effect of the higher cognitive demands increases by almost 50% (from $-.074$ to $-.109$) when the psychosocial variables are included, suggesting that academic control and the coping strategies students use suppress the effects of the demands that professors impose. In other words, when the psychosocial variables are controlled, the negative effect of high cognitive demands increase in importance.

The students' year of college has a relatively small effect on their academic achievement, which may not be surprisingly in this cross-sectional study. Students in advanced years probably do better than beginning students because they have learned how to cope and because those who have not are probably more likely to drop out of college. In fact, Lewington (1996) reports that between 10% and 50% of first-year entrants drop out of Canadian colleges and universities and Cuseo (1991) reports that about 39% of first-year college students in the US drop out without earning degrees. In other words, the potential human capital of a substantial number of students is not being effectively developed in colleges. Longitudinal research, of course, is necessary to more accurately determine the relationship between the pedagogical environment established in faculties and the psychosocial dispositions and GPAs of students.

Nevertheless, even when other variables are controlled, both year of college and course load, have a relatively strong effects on the students'

academic achievement suggesting that students who are in senior years and enrolled in more courses have significantly higher cumulative GPAs (Szafran, 2001). In essence, these results underscore the importance of the academic program variables in the students' commitment to academic work. It is surprising, however, that even when year of college and credit hours along with the other variables that are related to college work are controlled, the educational resources of the students' parents still had a relatively strong effect on their college GPAs. Significantly, virtually none of the effect of parental education is mediated by the psychosocial dispositions. These results indicate that parents directly help their children function academically rather than helping them indirectly by shaping their academic control and coping strategies. Thus, part of the influence of parental education likely results from the intellectual environments that well-educated parents provide for their children, another part likely results from the legacy of academic success these students have experienced already, not to mention the financial resources these families use in supporting the education of their children. Obviously, further research is required to determine more specifically how the educational resources of parents are translated into their children's psychosocial dispositions and GPAs in college.

Overall, our results suggest that the pedagogical environment established in faculties, specifically the cognitive demands and the social support that students encounter, make important contributions to their academic control and coping strategies. In turn, students' pedagogical environment and the psychosocial dispositions together affect their academic achievement. Controlling for SATs and using longitudinal analyses in which the pedagogical environment and the psychosocial dispositions of students are measured at different times would, of course, provide better estimates of the effects of these two sets of variables. In the absence of this evidence, however, our results suggest that the pedagogical environment of faculties can be improved by ensuring that students work in cooperative learning groups and by helping professors become more supportive and student-centered. College administrators and professors could help students, particularly beginning students, by creating greater social support for them along with setting appropriate cognitive demands that are neither too high nor too low. In other words, it is reasonable to believe that effective college professors provide both social support and cognitive demands for their students (Clifton and Roberts, 1993). As Perry and his colleagues (Perry, 1991, 2003; Perry and Penner, 1990) suggest, helping beginning students improve their sense of academic control and coping strategies would likely increase their GPAs and, hopefully, their graduation rates. These strategies, in turn, would enhance the human capital of students resulting in higher occupational status and incomes in the future.

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