

PERSISTENCE TO GRADUATE EDUCATION

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This paper examines the process by which students arrive in graduate school by estimating a causal model incorporating measures of socioeconomic background and undergraduate institutional characteristics and experiences. The student's background was found to influence strongly the initial choice of undergraduate institution, but the direct impact of background became nonsignificant as the student progressed through the educational process. However, background variables do affect decisions to enroll in graduate school, although indirectly, through intervening variables. Primary direct influences on graduate school attendance were found from variables associated with the undergraduate experience. Although both academic and social integration are significant for men and women, academic integration has greater influence for men, whereas for women, social integration has a slightly larger effect.

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Educational attainment is one of the primary goals of our society and, as such, has been the subject of a voluminous body of research. One of the methodologies used in this research has allowed the study of the dynamics of the educational process through causal modeling; a review of this research can be found in Wolfe (1985a). Causal modeling allows the specification and testing of hypothesized causal relationships among variables; thus, studies employing causal models have not only identified important factors relevant to levels of educational attainment but determined how their influences are exerted on decisions concerning educational outcomes.

The manner in which the socioeconomic background of a student influences postsecondary educational attainment has been depicted in estimated models employing various outcome measures. For example, using a model of educational aspirations, Heyns (1974) found the prevalent association between socioeconomic background and educational aspirations to be medi-

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ated by verbal achievement and curriculum placement. This pattern of influence was found to extend to actual educational attainment by Wolfle (1985b). Estimating a model of the process of postsecondary educational attainment, Wolfle found the best predictor of educational attainment to be curriculum placement, with inclusion in an academic track in high school leading on the average to nearly two more years of postsecondary schooling. The ability of the student was the most important determinant of curriculum placement. Although positive direct effects were found on educational attainment from some of the background measures, their primary impact in the model was on ability.

The identification of factors associated with the undergraduate experience that influence postsecondary educational attainment through the baccalaureate has been largely an outgrowth of the theoretical work of Tinto (1975). Based on the work of Spady (1970), Tinto postulated an explanatory model of student persistence in postsecondary education. Central to this model are the degree of social and academic integration within the institution. Among the studies testing the validity of Tinto's model is that of Pascarella and Terenzini (1983), who incorporated the salient constructs into a predictive model of freshman-year persistence/withdrawal behavior. Consistent with Tinto's theoretical views, they found that the effects of social and academic integration on persistence were approximately equal, and that the higher the level of integration within the institution, the greater the commitment to the institution and to persistence. Student background measures were found to exert direct influence only on the intervening variables of the model that measure institutional characteristics and aspects of the undergraduate experience.

The substantial body of research devoted to graduate education has served to identify characteristics of graduate students and reasons for attending graduate school (e.g., Baird, 1976; Creager, 1971; Gropper and Fitzpatrick, 1959; Heiss, 1970), but the majority of these studies have been atheoretical and descriptive, leaving a lack of understanding of how the influences of these factors are exerted. For example, Baird (1976) found that students from higher socioeconomic backgrounds were more likely to attend graduate school, but it is not known whether this influence is exerted directly on the decision to go to graduate school or indirectly by impacting earlier decisions concerning the educational process. Although the formulation of Tinto's (1975) model was an effort to understand voluntary withdrawal from the educational process at the undergraduate level, it also has potential for extending studies of the educational process beyond the undergraduate level.

The central purpose of this study is to test a model of the process by which the decision is made to enter graduate school. This decision is seen to be a further manifestation of a long series of prior judgments that reflect a

student's level of commitment to the educational process. Thus, this study is grounded in and extends prior research associated with student decisions concerning initial enrollment and subsequent persistence in postsecondary education.

THE MODEL

The model proposed in this study uses some of the core constructs of the Tinto (1975) persistence/withdrawal model and regards the decision to enter graduate school as a function of characteristics of the student's background, characteristics of the undergraduate institution attended, undergraduate experiences, and whether financial aid was offered at the graduate level. Each of the variables in the model influence this decision, but the manner in which this influence is exerted is expected to differ.

Enrollment in graduate school is the culmination of a series of decisions made by the student concerning the extent of commitment to the educational process. Initial decisions concern the choice of undergraduate institution. Once enrolled in that institution, the student makes choices concerning the degree of involvement within the institution and persistence to degree completion. Upon receipt of the baccalaureate, the decision is made concerning graduate school. Thus, factors affecting many of these earlier decisions are expected to influence the subsequent choice only indirectly. These paths of influence can be seen in the structure of the model itself, which is shown diagrammatically in Figure 1.

The first set of variables in the model comprises exogenous variables and represent various characteristics of the student's background (e.g., family's educational level and family income). It is from this background that the student begins his or her postsecondary education. The initial decisions made by students concerning the extent and type of postsecondary education desired are influenced primarily by family background and high-school experiences. In this model, these decisions are evidenced by the selectivity and size of the undergraduate institution attended, the first block of endogenous variables. The selectivity and size of the undergraduate institution are each considered a function of the background measures and of unspecified residual factors uncorrelated with the independent variables. No causal nexus is proposed between these variables, and their residuals are allowed to covary.

The next block of endogenous variables in the model is made up of measures of the student's social and academic integration within the undergraduate institution. These two variables are the central concepts in Tinto's (1975) postulation because he argued that the greater the student's social and academic involvement in the chosen institution, the more likely that student

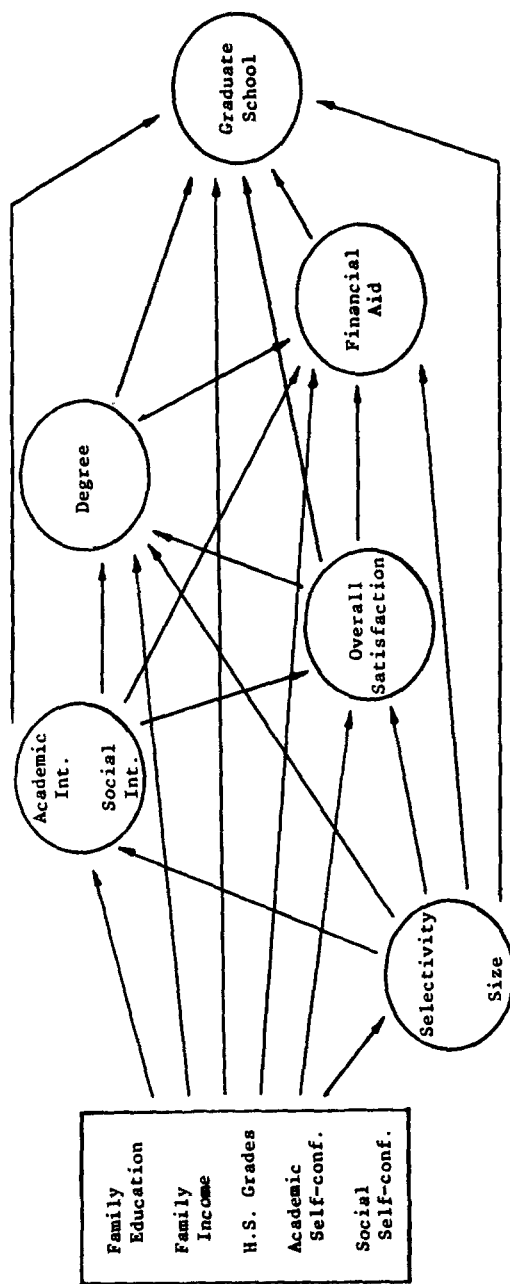


FIG. 1. Path diagram of the decision to enter graduate school.

will be to persist to degree completion. Both social and academic integration are seen to be determined by the exogenous variables and by the selectivity and size of the institution. Although arguments could be made that the extent of social involvement influences academic involvement, equally plausible arguments could be made reversing the direction of influence. For this reason, no causal order is proposed for these variables, and their residuals are allowed to covary, reflecting the extent to which the association between them is not explained by their mutual causes explicit in the model.

All of the variables previously defined are then seen to determine the overall level of satisfaction with the undergraduate experience. However, it is at this point in the model that the influences of the background characteristics are expected to be seen primarily as indirect effects through the intervening variables, rather than as direct influences. The waning influence of background traits is expected to be replaced by strong direct effects of the more recent experiences at the undergraduate institution.

The culmination of the undergraduate experience is the receipt of a bachelor's degree, which is the next endogenous variable in the model. The persistence to degree completion is seen to be a function of all preceding variables in the model. In accordance with Tinto's postulation, the extent of social and academic integration are expected to exert the strongest direct effects on degree completion, but additionally, significant indirect effects are expected from the background measures.

The next endogenous variable in the model is whether the student received financial aid in order to attend graduate school. This measure is included as an intervening variable between the completion of an undergraduate degree and the subsequent enrollment in graduate school and is expected to emphasize the growing dependence of graduate students on stipends or support for graduate study (Heiss, 1970).

Finally, enrollment in graduate school is seen to be dependent on all of the previously described variables. The strongest direct effects on this variable are expected, for obvious reasons, from degree completion and the receipt of financial aid. However, the importance of the extent of social and academic integration within the undergraduate institution to persistence in the post-secondary educational experience is expected to be evidenced further by significant positive effects on enrollment in graduate school. Students who become more involved in the social and academic aspects of the undergraduate experience are expected not only to be more likely to persist to undergraduate degree completion, but to exhibit further commitment to the educational process by subsequently enrolling in graduate school. Significant effects are also expected from the measure of overall satisfaction with the undergraduate experience. Students who are more satisfied with their educational experiences as an undergraduate should be more inclined to extend

their education by attending graduate school. Although significant direct effects are not expected from the background measures, the continuing importance of these variables is expected to be evidenced by strong positive indirect effects.

METHOD

The Data

Data for this study were drawn from the Cooperative Institutional Research Program (CIRP) sponsored by the American Council on Education and the University of California, Los Angeles (see Astin, 1982). This longitudinal study was designed to produce data on a wide range of cognitive and affective student outcomes of the collegiate experience. The respondents were surveyed initially as entering freshmen in the fall of 1971 and again in a follow-up survey during the winter of 1980. The sample was restricted to those respondents who in 1980 reported attendance at only one undergraduate institution. The restriction of attendance at only one undergraduate institution assured correspondence between the institutional characteristics measured in 1971 and the subsequent integration and satisfaction measures, as the 1980 survey asked these questions only with respect to the last undergraduate school attended. The model described above was estimated separately for men and women because previous studies (e.g., Pascarella and Terenzini, 1983) have shown sex to interact with many of the factors in the model. The analyses reported here are based on the 2,873 men and 3,369 women who had complete reports for all of the variables defined in Table 1.

Analysis

The estimation of the direct and indirect effects implied by the model proposed in this study was done in two parts. First, ordinary least-squares regression was used to estimate the coefficients of the eight structural equations defining the model.¹ Each endogenous variable was regressed on all exogenous variables and causally antecedent endogenous variables. This procedure resulted in eight sets of regression coefficients for men and women representing the direct effects of the causal factors on the dependent measures. These coefficients, along with the variances and covariances among each set of coefficients, were then used as input into SEINE (Wolfe and Ethington, 1985), a FORTRAN program based on the work of Sobel (1982) that computes indirect effects and the standard errors of indirect effects. On the recommendation of Sobel, only the unstandardized indirect effects were computed.

TABLE 1. Variable Definitions

Variable	Definition
Family education	Combined level of parents' education. This variable was formed by a summing of the variables representing mother's and father's educational level, each of which contained six categories ranging from (1) grammar school or less to (6) postgraduate degree.
Family income	Combined parental income with 12 categories ranging from (1) less than \$4,000 to (12) \$40,000 or more.
High-school grades	Student-reported grades received in high school with values ranging from (1) D to (8) A or A + .
Academic self-confidence	Student's self-rating of academic ability coded (1) lowest 10%, (2) below average, (3) average, (4) above average, and (5) highest 10%
Social self-confidence	Student's self-rating of social self-confidence. Same coding as above.
Selectivity	Mean SAT (or ACT equivalent) score of the undergraduate student body divided by 10.
Size	Total institutional enrollment measured on an interval scale ranging from (1) less than 250 to (9) 20,000 or more.
Academic integration	Average undergraduate grades coded from (1) D or less to (6) A – or more.
Social integration	Extent of involvement with peers and faculty. This variable was formed by a summing of four dichotomous items representing serving on a university or departmental committee, knowing a professor or administrator, being president of one or more student organizations, and having a major part in a play. Each of these four items was coded (1) no and (2) yes.
Overall satisfaction	Degree of overall satisfaction with the undergraduate institution. This variable was coded (1) not satisfied, (2) somewhat satisfied, and (3) very satisfied.
Degree	Receipt of a bachelor's degree. This variable was constructed from the item in the follow-up survey that indicated the highest degree currently held. This item was recorded so that 1 represented responses of bachelor's, master's, doctorate, or advanced professional degree, and 0 represented less than a bachelor's degree.

TABLE 1. (Continued)

Variable	Definition
Financial aid	Receipt of financial aid for attendance in graduate school. Respondents indicating aid from one or more sources (e.g., institutional fellowship, research assistantship, administrative assistantship, Ford, Woodrow Wilson, Danforth, other special fellowship, national fellowship fund, or CLEO) were given a value of 1. Respondents receiving aid from none of these sources were given 0.
Graduate school	Attendance in graduate school. Respondents indicating they currently held or were currently working on a master's, doctorate, or advanced professional degree were given a value of 1, others 0.

RESULTS

Raw data for the 2,873 men and 3,369 women who had complete reports for the variables described above were used to estimate the eight structural equations defining the model of the decision to enroll in graduate school. The correlations, means, and standard deviations for these variables are shown in Table 2.

The results of the estimation of the parameters of the structural equations are shown in Table 3 as standardized partial-regression coefficients. These coefficients are the direct effects of the individual predictor variables on the respective dependent variables and are interpreted in the usual manner; that is, an individual coefficient represents the average amount of change in the dependent variable produced by a unit change in the independent variable when the other independent variables in the equation are held constant. The variables measuring background characteristics, institutional characteristics, undergraduate experiences, degree attainment, and receipt of financial aid accounted for 35.45% and 31.16% of the variation in graduate school attendance for men and women, respectively, and the pattern of significant direct effects on this variable confirmed our a priori expectations. Degree completion and receipt of financial aid had, by far, the greatest impact on enrollment in graduate school for obvious reasons. Student background characteristics were not expected to impact this decision directly, and with the exception of social self-confidence, which had marginal significance for men, this was true. The stronger direct effects come from variables associated with the undergraduate experience.

Of the variables measuring characteristics of the undergraduate institu-

TABLE 2. Correlations, Means, and Standard Deviations for Variables in Model of Decision to Enter Graduate School: 1971 College Freshmen^a

	Family Educ.	Income	H.S. Grades	Academic Self-conf.	Social Self-conf.	Selectivity	Size	Social Int.	Academic Int.	Overall Sat.	Financial Aid	Degree	Graduate School
Family educ.	—	.538	.166	.258	.046	.382	-.013	.168	.185	.139	.084	.261	.154
Income	.545	—	.136	.228	.047	.343	.022	.128	.170	.105	.045	.192	.094
H.S. grades	.205	.124	—	.580	-.057	.384	.062	.130	.492	.164	.180	.252	.186
Academic self-conf.	.282	.200	.626	—	.080	.392	.073	.150	.405	.161	.156	.243	.176
Social self-conf.	.043	.021	.016	.067	—	-.015	.034	.133	-.026	.052	.038	.008	.024
Selectivity	.350	.320	.487	.448	.005	—	.212	.122	.167	.158	.158	.305	.192
Size	.000	.016	.087	.083	.036	.149	—	-.150	-.048	-.053	.018	.042	.036
Social int.	.103	.065	.122	.120	.137	.072	-.163	—	.225	.192	.176	.283	.242
Academic int.	.175	.168	.523	.450	-.007	.255	-.008	.216	—	.245	.176	.332	.248
Overall sat.	.131	.095	.163	.141	.037	.183	-.021	.221	.282	—	.048	.196	.116
Financial aid	.140	.078	.224	.207	-.017	.222	-.003	.135	.271	.123	—	.186	.420
Degree	.219	.180	.300	.281	.013	.331	.026	.251	.399	.310	.191	—	.422
Grad. school	.179	.142	.306	.284	.042	.302	.042	.200	.379	.221	.422	.448	—
<i>Men</i>													
Mean	7.135	5.731	5.241	3.847	3.145	103.503	5.429	5.238	4.505	2.531	.176	.810	.493
SD	2.482	2.680	1.674	.768	.846	15.831	1.840	.936	1.038	.593	.381	.393	.500
<i>Women</i>													
Mean	7.229	5.501	5.725	3.801	3.061	100.169	5.270	5.229	4.805	2.572	.149	.798	.446
SD	2.558	2.633	1.505	.723	.794	14.587	1.866	.934	.925	.560	.356	.402	.497

^aCorrelations below the main diagonal are for men (N = 2,873). Correlations above the main diagonal are for women (N = 3,369).

TABLE 3. Structural Parameter Estimates of Model of the Decision to Enter Graduate School for 1971 College Freshmen^a

Dependent variables	Independent Variables										R ²		
	Family educ.	Income	H.S. grades	Academic self-conf.	Social self-conf.	Selectivity	Size	Social int.	Academic int.	Overall sat.		Degree sat.	Financial aid
Selectivity	.145* (.923)	.167* (.985)	.332* (3.140)	.167* (3.451)	-.021 (-.392)								.340
Size	-.038 (-.028)	.019 (.013)	.061** (.067)	-.050** (.119)	.033 (.071)								.011
Social integration	.056** (.021)	.011 (.004)	.088* (.049)	.048** (.059)	.136* (.151)	.011 (.001)	-.182* (-.092)						.072
Academic integration	.003 (.001)	.096* (.037)	.420* (.260)	.202* (.273)	-.027 (-.033)	-.064* (-.004)	-.052* (-.030)						.311
Overall satisfaction	.051** (.012)	-.015 (-.003)	-.031 (-.011)	-.038 (-.029)	.018 (.012)	.130* (.005)	-.007 (-.002)	.160* (.102)	.241* (.138)				.123
Degree	.058* (.009)	.018 (.003)	.007 (.002)	.021 (.010)	-.017 (-.008)	.185* (.005)	.025 (.005)	.144* (.060)	.249* (.094)	.162* (.107)			.271
Financial aid	.060* (.009)	-.046** (-.006)	.023 (.005)	.032 (.016)	-.030 (-.014)	.128* (.003)	-.013 (-.003)	.068* (.028)	.175* (.064)	.013 (.008)	.038 (.037)		.111
Graduate school	.003 (.001)	.008 (.002)	.026 (.008)	.022 (.015)	.034** (.020)	.072* (.002)	.028 (.008)	.043* (.023)	.125* (.060)	.030 (.025)	.280* (.356)	.299* (.392)	.355

MEN

	WOMEN										
Selectivity	.217*	.158*	.224*	.173*	-.034**						.291
	(1.238)	(.873)	(2.169)	(3.495)	(-.618)						
Size	-.051**	.030	.035	.057*	.033						.009
	(- .037)	(.022)	(.043)	(.146)	(.077)						
Social integration	.091*	.032	.073*	.052**	.134*	.068*	-.177*				.090
	(.033)	(.011)	(.045)	(.067)	(.158)	(.004)	(-.089)				
Academic integration	.070*	.072*	.406*	.180*	-.022	-.098*	-.066*				.285
	(.025)	(.025)	(.250)	(.230)	(-.026)	(-.006)	(-.032)				
Overall satisfaction	.041**	-.003	.012	.014	.043**	.100*	-.051*	.182*			.097
	(.009)	(-.001)	(.004)	(.011)	(.030)	(.004)	(-.015)	(.110)			
Degree	.110*	.002	.018	.009	-.019	.172*	.047*	.213*	.064*		.227
	(.017)	(.000)	(.005)	(.005)	(-.010)	(.005)	(.010)	(.093)	(.046)		
Financial aid	.003	-.044**	.071*	.022	.031	.084*	.010	.119*	-.037**	.092*	.079
	(.000)	(-.006)	(.017)	(.011)	(.014)	(.002)	(.002)	(.045)	(-.024)	(.081)	
Graduate school	.026	-.023	-.008	.003	-.002	.017	.030**	.083*	.006	.305*	.312
	(.005)	(-.004)	(-.003)	(.002)	(-.001)	(.001)	(.008)	(.044)	(.005)	(.377)	(.465)

^aMetric coefficients are given in parenthesis.

* $p < .01$; ** $p < .05$.

tion, the selectivity of the undergraduate institution has a strong positive direct effect on graduate school attendance for men, a finding indicating that the initial choice of undergraduate institution is an important one for men in terms of subsequent graduate-school attendance. Men attending more selective institutions are more likely to attend graduate school. This result may well reflect the selectivity of graduate admissions or the fact that brighter students attend more selective institutions and are more likely to attend graduate school. In contrast, it is the size of the undergraduate institution that is influential for women, not the selectivity. In any event, the characteristics of the choice of institution are further enhanced by the extent of involvement within that institution for both men and women.

The significant direct effects for both men and women of the social and academic integration variables net of the influence of the other factors extend the importance of these concepts from within the confines of undergraduate degree completion. Previous studies have shown the impact of these variables on short-term persistence to undergraduate degree completion (e.g., Munro, 1981; Pascarella and Terenzini, 1983; Terenzini and Pascarella, 1977, 1978), but these results imply that they are also important factors in the continuation of the educational process beyond the baccalaureate. The greater the social and academic involvement of students in the undergraduate institution, the more likely they are to extend their education by attending graduate school.

The social and academic integration variables have nearly the same impact on graduate school attendance for women, with social integration having a slightly higher effect than academic integration. However, academic integration is nearly three times as important as social integration for men. This finding, together with the importance of the selectivity of the institution, indicates that academic orientations carry much more impact for men than for women in terms of graduate school attendance.

An examination of the direct effects on other variables in the model shows the important influences that directly affect the decisions made by students as they progress through postsecondary education. The background characteristics have significant effects on the initial decisions made concerning the type of undergraduate institution chosen, with four of the five measures having significant influences on the selectivity of the institution for both men and women. However, at the completion of the undergraduate experience, only the family's educational level continues to exert direct influence. The importance of the core concepts from Tinto's model (1975), social and academic integration, to degree completion is again confirmed in this model. In fact, these variables show significant direct effects on all subsequent dependent measures, a finding indicating that the extent of involvement within the undergraduate institution impacts strongly on later decisions concerning the educational process.

The dynamics of the process by which a student arrives in graduate school are further evidenced in the indirect influences of the variables in the model. The indirect effects on the endogenous variables from the exogenous and the causally antecedent endogenous variables are shown in Table 4. These effects represent the influence on the dependent variable that is the result of directly influencing intervening variables in the model. Consider, for example, the effect of academic integration on graduate school attendance for men. The significant indirect effect represents an additional increase of .0695 in the measure for graduate school attendance for a unit change in academic integration over and beyond the direct effect of .060. This additional effect is the result of directly influencing undergraduate degree attainment and receipt of financial aid, which, in turn, exert significant influence on graduate school attendance. Thus, the total effect of academic integration within the undergraduate institution is the sum of the direct and indirect effects: .1295.

Although the strongest direct influences on graduate school attendance come from the variables associated with the undergraduate experience, significant indirect effects are found from all of the variables in the model for men or women. Four of the five background variables have significant indirect effects, a finding indicating that the background from which a student comes continues to impact strongly on later educational decisions by directly influencing mediating variables in the model. For example, the lack of significance of the direct effects of family's income and educational levels on graduate school attendance might lead to the conclusion that socioeconomic background does not influence decisions to attend graduate school; that is, students from lower socioeconomic backgrounds are not at a disadvantage. However, the significant positive indirect effects of these variables show that the initial advantage given to students from higher socioeconomic backgrounds by attending more selective undergraduate institutions is not entirely overcome by the undergraduate experience itself.

The significant indirect effects of the social and academic involvement variables on both the attainment of a bachelor's degree and enrollment in graduate school further emphasize the importance of these variables in models of the educational process. The successful integration of a student within the social and academic systems of the undergraduate institution directly and indirectly enhances the likelihood that the student will persist in the educational process, not only to degree completion, but continuing in graduate education.

CONCLUSIONS

The path by which a person arrives in graduate school is not a particularly complicated one. The student enrolls in an undergraduate institution with

TABLE 4. Unstandardized Indirect Effects in Model of Decision to Enter Graduate School^a

Dependent variables	Independent Variables										
	Family educ.	Income	H.S. grades	Academic self-conf.	Social self-conf.	Selectivity	Size	Social int.	Academic int.	Overall sat.	Degree
	MEN										
Social integration	.0032 (.0020)	-.0006 (.0019)	-.0042 (.0048)	-.0088 (.0071)	-.0068 (.0039)						
Academic integration	-.0030 ^b (.0014)	-.0045 ^b (.0014)	-.0152 ^b (.0041)	-.0050 (.0050)	-.0005 (.0019)						
Overall satisfaction	.0068 ^b (.0017)	.0096 ^b (.0016)	.0535 ^b (.0047)	.0569 ^b (.0068)	.0080 (.0041)	-.0005 ^b (.0002)	-.0135 ^b (.0019)				
Degree	.0074 ^b (.0014)	.0085 ^b (.0013)	.0452 ^b (.0032)	.0466 ^b (.0053)	.0063 (.0034)	.0001 (.0002)	-.0100 ^b (.0015)	.0109 ^b (.0017)	.0148 ^b (.0020)		
Financial aid	-.0043 ^b (.0009)	.0056 ^b (.0009)	.0286 ^b (.0029)	.0304 ^b (.0038)	.0006 (.0022)	-.0000 (.0002)	-.0048 ^b (.0010)	.0035 (.0017)	.0052 ^b (.0025)	.0040 (.0022)	
Graduate school	.0140 ^b (.0023)	.0082 ^b (.0021)	.0545 ^b (.0045)	.0643 ^b (.0082)	-.0042 (.0055)	.0027 ^b (.0004)	-.0089 ^b (.0025)	.0402 ^b (.0045)	.0695 ^b (.0052)	.0429 ^b (.0068)	.0145 (.0079)
	WOMEN										
Social integration	.0087 ^b (.0022)	.0019 (.0017)	.0056 (.0037)	.0023 (.0068)	-.0095 ^b (.0040)						
Academic integration	-.0065 ^b (.0017)	-.0061 ^b (.0012)	-.0148 ^b (.0028)	-.0264 ^b (.0048)	.0013 (.0024)						
Overall satisfaction	.0103 ^b (.0015)	.0061 ^b (.0012)	.0371 ^b (.0038)	.0385 ^b (.0053)	.0040 (.0033)	-.0004 ^b (.0002)	-.0097 ^b (.0014)				
Degree	.0116 ^b (.0012)	.0075 ^b (.0011)	.0386 ^b (.0028)	.0448 ^b (.0045)	.0092 ^b (.0030)	-.0001 (.0002)	-.0114 ^b (.0012)	.0032 ^b (.0009)	.0050 ^b (.0014)		
Financial aid	.0068 ^b (.0009)	.0035 ^b (.0007)	.0165 ^b (.0024)	.0196 ^b (.0032)	.0040 (.0019)	.0003 ^b (.0001)	-.0045 ^b (.0009)	.0052 ^b (.0017)	.0053 ^b (.0021)	.0037 ^b (.0012)	
Graduate school	.0173 ^b (.0022)	.0038 (.0020)	.0446 ^b (.0044)	.0469 ^b (.0081)	.0142 ^b (.0057)	.0028 ^b (.0004)	-.0069 ^b (.0025)	.0557 ^b (.0047)	.0539 ^b (.0054)	.0080 (.0071)	.0378 ^b (.0079)

^aStandard errors are given in parenthesis.

^bIndirect effect is at least twice its standard error.

certain background characteristics, undergoes various experiences there, receives a baccalaureate, and subsequently makes a decision concerning graduate school. The estimation of the model proposed in this study has identified some of the important influences on this decision for the respondents in our sample.

The primary direct influences on the ultimate decision to enroll in graduate school were found to come from variables associated with the undergraduate experience. Net of undergraduate degree attainment and receipt of financial aid, the strongest effects were from the extent of integration within the social and academic systems of the institution. Although both measures are significant for both men and women, academic integration is by far the more influential for men, whereas for women, social integration has a slightly larger effect than academic integration.

These findings also underscore and extend the importance of Tinto's (1975) core concepts: academic and social integration within the undergraduate institution. Not only are they crucial variables in studies of persistence/withdrawal behavior in undergraduate institutions, but they have been found here to continue to exert strong influences, both directly and indirectly, on further commitments to the educational process.

The social background from which a student comes was found to influence strongly the initial choice of an undergraduate institution, but the direct impact of background became nonsignificant as the student progressed through the educational process. The examination of the indirect effects, however, indicated that background variables do continue to affect the decision to enroll in graduate school, although indirectly, through the intervening variables.

These results somewhat explain the contradictory findings of previous descriptive studies. A summary of results from surveys by various researchers given in Baird (1976) showed that graduate school attendance was not strongly related to background, and that socialization to middle-class values occurred during the undergraduate years. Yet, Baird's own survey found that students from higher socioeconomic backgrounds were more likely to attend graduate school, and that even though students from lower income homes were more eligible for financial aid, the aid did not compensate for the initial disadvantage.

For those in our sample, socioeconomic background did influence the decision to attend graduate school, not directly, but indirectly by influencing the choice of undergraduate institution and the extent of integration within that institution. These variables, in turn, directly affected subsequent graduate-school attendance. Thus, the advantage given to higher-status students was carried over and enhanced by the socialization process that occurred at the undergraduate institution. For lower-status students who aspired to

graduate school, it is evident that in order to overcome their initial obstacles, they had to become more highly integrated within the social and academic aspects of the undergraduate institution.

It appears that the factors directly affecting educational decisions come from the more immediate surroundings. Initial decisions concerning post-secondary education are primarily influenced by recent high-school experiences and social background. However, these factors only indirectly influence the decision to persist or withdraw, which is influenced primarily by recent experiences in the undergraduate setting. This pattern of influence is consistent with extant research findings on persistence/withdrawal behavior (e.g., Munro, 1981; Pascarella and Chapman, 1983; Pascarella and Terenzini, 1983) and was here found to extend to the subsequent decision to enroll in graduate school.

The model proposed in this study is not the definitive model of the process by which students choose to attend graduate school. Other models may be proposed containing other salient factors thought to influence this decision. However, the estimation of this model has contributed to an understanding of how the influences of student background and undergraduate experiences are exerted on decisions to enroll in graduate school.

NOTE

1. The appropriateness of ordinary least-squares methods for these data may be questioned because of the inclusion of three dichotomous variables. The dependent measure, graduate school attendance, is a dichotomy but has a mean of .493 and .446 for men and women, respectively. However, the other two dichotomies are substantially skewed in opposite directions. The variables measuring undergraduate degree attainment and receipt of financial aid have means of .810 and .176 for men and .798 and .149 for women, indicating an absolute skewness of approximately 1.5.

Even though raw data are analyzed, ordinary least-squares procedures ignore moments higher than the second, and the results are the same as the analysis of Pearson product-moment matrices. In this instance, the skewness or kurtosis of the variables is ignored, and associations involving the dichotomous variables are underestimated. One way in which to take into account the skewness of the variables is to use tetrachoric or polyserial correlations to estimate associations involving the dichotomous variables. Although, on the average, the use of these correlations produces more accurate parameter estimates, the greater variability of the estimates can, for a single case, result in estimates far from the true parameter (see Wolfle and Ethington, 1985a). Because of this variability in the estimates, we have chosen not to use tetrachoric and polyserial correlations, but we recognize that the true effects may be underestimated.

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