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ABSTRACT

The influences of academic and social integration on academic skills development of male and female freshmen and sophomores at a large, selective, public research university were studied. Questionnaires were completed by 277 female and 186 male students after summer 1980 freshman orientation and in the spring of the next two academic years. Indicators of academic and social integration were: number of meetings with faculty outside classrooms; hours per week spent in extracurricular activities; measures of social and academic integration in the Tinto model; and level of classroom and social involvement. Differences were found in the amount of reported growth for men and women and causal influences. Women reported significantly more academic skill development than men in the sophomore year, and they also appeared to experience higher levels of social integration than men during the freshman year. Freshman year academic integration was found to have an indirect effect on sophomore year reported growth for both groups. Social integration for men was independent of both academic integration and reported growth in both years, while for women it was modestly related to freshman year growth and negatively related to sophomore year academic integration. A five page reference list is included. (SW)

DIFFERENCES IN ACADEMIC SKILL DEVELOPMENT AMONG MEN AND WOMEN DURING THE FIRST TWO YEARS OF COLLEGE

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Abstract

This study explored the influences of varying levels of integration in the academic and social systems of a university on the reported freshman and sophomore year academic skill development of men and women students. Results indicate that both the amount of reported growth and the causal structure of the influences on that growth are significantly different for women than for men. Moreover, freshman year academic integration was found to have an indirect effect on sophomore year reported growth for both groups that was as great (among men), or nearly as great (among women), as its direct effect on reported freshman year growth.

DIFFERENCES IN ACADEMIC SKILL DEVELOPMENT AMONG MEN AND WOMEN DURING THE FIRST TWO YEARS OF COLLEGE

As a review of the early research done on college students quickly makes apparent, the nature of the questions addressed, and the conceptual, research and measurement approaches adopted, were heavily influenced by the discipline of the researcher. Psychologists sought a series of attitudinal and behavioral predictors quite different from those investigated by sociologists. Whereas the former sought explarations of student behavior in conditions and dynamics within individuals, the latter adopted conceptual approaches that looked to social structures and norms in students' external environment. While such a condition was to be expected, it also tended to concentrate attention on one or another of the sources of influence on human behavior.

During the 1960s, models of college student behavior were developed that reflected both individual and environmental characteristics and theories of how the interactions among these sets of variables might, in combination, shape students' learning and behavior (e.g., Holland, 1966; Pace, 1969; Pace and Stern, 1958; Pervin, 1967; Stern, 1970). More recently, the relation between the individual and the environment, and the magnitudes of both their individual and joint influences on student growth, have received increased attention. Spady (1970) and Tinto (1975) wrote of academic and social integration in seeking to explain college student attrition. Pace (1979) has offered a model of college "impress" which specifies that the outcomes of college are a function of the pre-college characteristics of the student, the nature of the student's encounters with the collegiate environment, and the nature and amount of

effort the student invests in learning. Astin (1977, 1985) and the Study Group on the Conditions of Excellence in American Higher Education (1984) introduced the concept of student "involvement" to the national dialogue on undergraduate education, as well as to the lexicon of researchers studying how students learn and grow and how institutions and collegiate experiences might be designed to facilitate that growth.

There can be little doubt that students grow in a variety of ways during their college years and that at least some of this development is a function of college attendance and distinct from normal maturation (Feldman & Newcomb, 1969; Hyman, Wright & Reed, 1975; Astin, 1977; Bowen, 1977; Pace, 1979; Pascarella, 1985). There is, of course, less agreement about just how much of students' growth is attributable to the collegiate experience, about which particular elements of that experience are salient, and whether the effects of those experiences are uniform for different kinds of students.

Literature reviews and various individual studies increasingly point, however, not only toward the interaction of the individual and the collegiate environment, but also to the interaction of the cognitive and affective dimensions of the same individual student's nature. Pace (1979) recognized the early cognitive-affective bifurcation in the research on college students and called for studies of how these two domains may interact and conceivably reinforce one another in students' growth in a variety of areas. Korn (1986), after reviewing five "perspectives on the impact of college on students," noted that "the thrust of the reported findings indicates there are complex interactions between what has been traditionally labeled the cognitive and affective domains of human behavior" (p. 11). Korn briefly reviews this "cognitive

revolution in psychology" and notes that a "key element in this conceptual revolution is understanding an individual's active transaction/interaction with significant aspects of his or her environment" (p. 13).

Evidence consistent with this view has emerged in the study of college students' reported growth in various areas and in their behaviors. For example, Pascarella and Terenzini (1979) found several statistically reliable interactions between varying levels of social and academic integration (high levels of one tending to compensate for low levels of the other) in positively influencing student retention. Similarly, students' levels of integration in an institution's academic systems have been found to influence their reported level of social integration, and levels of both academic and social integration have been associated with students' reported academic development (Terenzini & Wright, in press) and personal growth (Terenzini & Wright, 1987).

Much of the work done in this area, however, has been based on whole samples, with limited efforts to explore whether the pattern or strength of the influences might vary for different kinds of students. Such traits as sex, or race and ethnicity, have been controlled in most of this research, but relatively few studies have explored whether, and how, the causal structure presumed to operate may be different for different kinds of students. Terenzini and Wright (in press), for example, studied students' reported academic growth over a four-year period, but their causal analysis was based on a combined sample of men and women. Evidence exists, however (e.g., Clinchy & Zimmerman, 1982; Belenky, Clinchy, Goldberger, & Tarule, 1986) to suggest that women undergo a developmental sequence different from that described by Perry (1970),

based on his studies of students consisting primarily of males at Harvard College.

Moreover, most studies of students' academic and intellectual development focus on growth during a single year (typically the freshman year), or over the collegiate career (usually contrasting students' freshman- and senior-year scores on the same variable). Few studies have attempted to monitor the rate of academic development, or the variability of the pattern of influences on such growth, from year to year to determine when and how such development occurs. Moreover, few studies have sought to identify those collegiate experiences that might facilitate or impede the acquisition of academic skills and over which institutions have some policy or programmatic control.

This study sought to extend the developing line of inquiry into how students' involvement in the academic and social systems of an institution might influence students' reported academic skill development, and whether such development might be different for men and women during the first two years of college.

METHODS

Theoretical Framework

Several models have been advanced for explaining how students develop in the college setting. Astin (1985) offers the "involvement" theory of student learning, which he states in its simplest form as: "Students learn by becoming involved" (p. 133). Among the basic postulates of this theory are that involvement requires "the investment of physical and psychological energy," "occurs along a continuum," "has

both quantitative and qualitative features," and involves both attitudinal and behavioral dimensions (pp. 135-136). This theory, however, provides only general guidance to researchers interested in a more detailed specification of the dynamics of collegiate impact.

Tinto (1975), in his model of the undergraduate dropout process, offers a more detailed statement of potentially significant influences on one college student outcome. Tinto theorizes that students' pre-college traits and levels of commitment to the institution and to personal goals influence the manner in which the student interacts with the institutional environment. These interactions, in turn, lead to varying levels of integration in the institution's academic and social systems. According to Tinto, the level of academic and social integration (other things being equal) is positively related to the likelihood that the student will continue enrollment.

Tinto's model, however, may also be a useful framework for conceptualizing the variables and processes potentially involved in other areas of collegiate impact on students, incorporating as it does many of the basic components or themes of other developmental theories (e.g., Astin's (1985) notion of "involvement") in a comparatively explicit causal model. If the college experience positively influences students' personal and academic growth, then it seems reasonable to expect the student who is more integrated into (or "involved" in) the academic and social life of an institution will grow more in a number of ways than will a less integrated or involved student. On this assumption, the present study focused on the influence of students' academic and social integration levels on their reported academic growth during the first two

years of college. For reasons explained below, however, certain components of the Tinto model were not included in this study.

Freedman (1965), Lehmann and Dressel (cited in Feldman & Newcomb, 1969), and Sanford (1965) have suggested that the amount of educational and personal development in the first year of college far exceeds that occurring in any subsequent year. Lehmann, moreover, found that ". . . the greatest changes in attitudes, values, and critical thinking ability take place during the freshman and sophomore years" (1968, p. 388). For these reasons, this study focused on the first two years of college. Based on the work of Clinchy and Zimmerman (1982) and Belenky, Clinchy, Goldberger and Tarule (1986), as well as many other studies indicating important difference between men and women in their responses to the collegiate environment, this study also sought to differentiate the sources of influence on academic growth among men and women.

Design and Sample

During the summer of 1980, freshmen attending a randomly-selected five of nine summer orientation sessions at a large, selective, public research university in the northeast were asked to complete a locally-developed questionnaire soliciting a variety of academic and personal background information. Usable responses were received from 1,105 freshmen who subsequently matriculated (approximately 50% of the 1980 freshmen class).

In April of each of the two succeeding academic years, a detailed questionnaire asking students about their experiences during the year just ending was sent to each of the students who had participated in the preceding year's data collection. After a follow-up mailing each year, usable response rates were: freshmen year, n = 723 (65%), and sophomore

year, n = 463 (64%). This study, then, is based on the responses of the 463 students (277 women and 186 men) who participated in each of the three data collections for the study. This group constitutes 42 percent of the original sample, and 22 percent of the original entering freshman class. Tests indicate that respondents are representative of the population of freshmen with respect to academic aptitude (combined SAT scores), high school achievement (high school percentile rank), and combined parental education.

Variables

Students' pre-college characteristics, treated as exogenous variables (i.e., outside the causal model), were high school achievement (percentile rank in graduating class) and highest degree planned (bachelor's, master's or doctorate). Preliminary analyses indicated that other background variables for which data were available (race or ethnicity, combined SAT scores, and parents' level of formal education) were not reliably related to the dependent measure nor to other post-matriculation variables and were, consequently, excluded from the model.

To measure students' levels of integration in the academic and social systems of the institution, each year's follow-up instrument asked students to: 1) estimate the number of times during the year they had met with a faculty member outside the classroom for each of six reasons (only conversations lasting 10 to 15 minutes or more were to be counted); 2) indicate the number of hours per week, on the average, they had spent in organized, extra-curricular activities in both the fall and spring semesters (subsequently summed to form a single index); 3) to respond to a series of 34 Likert scale items specifically designed to measure

various dimensions of social and academic integration in the Tinto model, and 4) to respond to ten items describing various indicators of level of classroom and social involvement.

The 34 Likert items, comprising five dimensions, were taken from Pascarella and Terenzini (1980). A series of principal components analyses indicated substantial stability of the five-factor solution across academic years. Scales based on three of these factorial dimensions, labeled "peer relations," "faculty relations" and "faculty concern for student development and teaching," were used in this study. The internal consistency (alpha) reliability coefficients for these three scales ranged from .71 to .82 in this study.

Frequency of contact with faculty was measured by students' estimates of the total (summed) number of times during the year they had met with a faculty member outside of class for "academic" purposes (to get academic program advice, to discuss careers, or to discuss intellectual or course-related topics), and for "non-academic" purposes (to discuss personal problems, to discuss campus issues, or to socialize informally). To correct for positive skewness, a constant of one was added to each sum, which was then transformed to a natural logarithm prior to analysis.

Indicators of students' classroom and social involvement were taken from Terenzini, Pascarella and Lorang (1982) and have alpha internal consistency reliability coefficients of .61 and .75. Sample items from the classroom experience scale are: "enjoyed my classes" and "learned something new in my classes." The social involvement scale includes such items as "felt at home here" and "met students who were interesting."

Principal components analyses indicated that the two-factor solution is stable across years for the students in this study.

Thus, the predictor variables in this study were the two covariates listed earlier and eight independent variables, or "college experience" variables, grouped in two sets--one reflecting academic integration, the other indexing social integration--for each of the four years under study. The variables comprising each set are given in Table 1.

As noted previously, this study does not afford a comprehensive test of the utility of Tinto's model for predicting educational outcomes other than attrition inasmuch as the concepts of institutional and goal commitments are not included here. These constructs were excluded for both practical and conceptual reasons. First, as a practical matter, the number of variables comprising this model of student growth over a two-year period was large, making data analysis increasingly cumbersome and tending toward making results potentially unstable, given the number of subjects. Moreover, the available data reflecting institutional and goal commitments were of questionable psychometric quality.

Conceptual considerations were also involved, however. While the role of institutional commitment in students' attrition decisions is well-established, it seems reasonable to question whether a student's commitment to attendance at a particular institution will have a significant influence on that student's academic skill development. It is likely to have <u>some</u> influence, but whether it would be a major force is arguable. The decision was made that this variable was not critical to the model being developed and, given the additional considerations above, it was consequently excluded.

While this study included students' goals with regard to the highest degree expected as a background (and exogenous) variable, the absence of measures of students' commitments to achieving other academic and career/vocational goals is more problemmatic. These commitments might well be expected to influence, for example, the amount of effort a student exerts, which, in turn, might be expected to affect not only the level of that students' academic (and possibly social) integration, but also the extent of academic growth experienced. The absence of such variables constitutes a more serious weakness in this study, a matter which is discussed further below.

In each of the two annual follow-up surveys, students were also asked to indicate the amount of progress they had made during the year just ending in each of twenty-nine skill or growth areas (Terenzini, Pascarella and Lorang, 1982). The items were scored on a 1-4 scale, where 1 = "no progress at all" and 4 = "a great deal of progress." One of the four components derived factorially from these items, the "academic skill development" scale, was adopted for this study as the measure of students' academic growth in each of the two years. This scale includes the following four items: 1) gaining factual knowledge (terminology, methods, trends); 2) developing the ability to evaluate critically ideas, materials and methods; 3) developing the ability to apply abstractions or principles in theories. The internal consistency reliabilities for this scale were .70 and .71 for the freshman and sophomore years, respectively.

Analytical Method.

Figure 1 displays the structural model tested for men and women, showing both the LISREL "measurement model" and "structural model." The

boxes represent the measured variables used in the analyses (and given in Table 1). The oval to which the boxes are connected represents the latent construct the observed variables (combined) are presumed to reflect. The boxes and the oval to which each is attached, taken together, constitute the LISREL "measurement model" and provide a summary of how each latent construct (oval) was empirically constituted. The connections between and among the ovals in Figure 1 constitute the "structural model" and specify the hypothesized relations among variables based on the theoretical framework underlying the study.

In this study, as can be seen in Figure 1, students' entering goal commitments and high school achievement levels are exogeneous background variables (i.e., determined by forces outside the causal structure) that are presumed to influence levels of academic integration in the freshman year. Academic integration was presumed to be reflected in students' scores on the variables listed under that heading in Table 1 and whose acronyms are given in the boxes in Figure 1. Social integration was operationalized by scores on variables listed under that heading in the same table. Academic and social integration levels are presumed to influence each other reciprocally, to effect the amount of academic growth reported at the end of the freshman year, and to influence academic and social integration levels in the succeeding year. Freshman year academic growth, in turn, is expected to influence the following year's academic and social integration levels, as well as the academic skill development reported for the sophomore year.

LISREL VI (Joreskog & Sorbom, 1984) was used to test for differences between men and women in this causal structure of the impact of college on students' academic growth. LISREL offers several advantages over the

more common ordinary least-squares (OLS) path analytic techniques, providing a more comprehensive and rigorous test of a model's empirical adequacy as an explanatory system (Hennessey, 1985). First, LISREL models are nonrecursive, permitting tests for reciprocal effects. Second, LISREL enables the researcher to model measurement error and autocorrelation (the correlation between the same measure taken at two or more different times), thus producing relatively unbiased path estimates. Third, whereas the assumption of uncorrelated error terms in OLS factor analytic techniques is frequently violated, LISREL permits estimation of the effects of latent (unobservable) constructs while simultaneously controlling for correlations among their empirical indicators. Thus, LISREL's confirmatory factor analysis produces more reliable (unbiased) estimators.

Finally, LISREL enables the researcher to test the internal validity of the causal model by estimating the causal structure for one group and then imposing the estimated structure on a separate group (in this case, men and women), thus providing a direct test of the equality or inequality of the causal structures for the two groups. In contrast, OLS path analytic techniques do not permit such direct comparison of two path models because of their use of standardized regression (i.e., path) coefficients. Standardized coefficients are rarely compared because of the recognized problems that occur when variances differ across samples of interest (Heise, 1969).

The comparison of the causal structures for academic growth among men and women involved five stages. First, the causal relations specified by Tinto's model were translated into an initial measurement model for men and women using a confirmatory factor analytic technique.

This measurement model treats the endogenous concepts of academic and social integration as "latent" (or unobservable) variables with multiple indicators. Second, a series of structural equations representing the hypothesized theoretical structure (see Figure 1) was incorporated into the women's measurement model. Third, specific hypotheses in the overall fit of the model were evaluated using both test of structural parameter estimates and a more global goodness-of-fit test. The women's model was modified as indicated by the LISREL program to produce the best fitting structural model (i.e., the estimated model that most closely reproduces the covariance structure of the sample). This process has been referred to as "model trimming." Fourth, once the best fitting model for women was determined, the structural parameters were fixed and the model was rerun using the correlation matrix from the men. The overall Goodness-of-Fit test (where the index can vary from 0 to 1, with 0 reflecting no fit and 1 indicating a perfect fit) was used to indicate the degree to which the estimated causal model for the women adequately reproduced the observed covariance structure of the men's sample. Fifth, the best fitting model for the males was determined and visually compared with that of the women. The results of these comparisons and the structure of these two, "best fitting" models are described in the next section.

RESULTS

Table 1 gives the means and standard deviations for all observed variables used in this study. Women appear to report slightly more academic development than men in both years, but only in the sophomore year is the difference reliable ($t = 1.98$, d.f. = 461, 2-tail $p < .05$).

Both men and women report less academic growth in the second year (compared with the first), but in neither instance is the drop statistically significant. Men have reliably higher degree aspirations than women at the time of matriculation, and in both years report greater involvement than women in extra-curricular activities (although participation is not high for either group). Women, in contrast, enter with higher levels of high school achievement and subsequently report significantly more positive peer relations in both years and reliably greater involvement in the social life of the institution during the freshman year.

The results of the five-step process described above for comparing the causal structures for men and women indicated substantial differences between the groups. This conclusion is based on the magnitude of the goodness-of-fit test for the men when based on the parameters fixed according to those of the women's best fitting model, as well as on the differences that are apparent in even a cursory comparison of the causal structures of the best fitting models for each group (see Figures 2 & 3).

Figure 2 shows the results of the LISREL analysis for men. The values (lambdas) next to the lines connecting the boxes to the ovals in the measurement model are interpretable as standardized regression coefficients (i.e., beta weights) and reflect the relative contribution of each variable to the operationalization of the latent construct: the higher the lambda, the larger the contribution to defining the latent trait.[1] For purposes of model identification, one parameter (the best indicator of the underlying construct) is set with a starting value of 1.0. The internal consistency (alpha) reliability of the latent trait variables can be estimated by averaging the lambdas for the component variables. For the men's model, this procedure indicates alpha

reliabilities of .74 and .75 for academic integration in the freshman and sophomore years, respectively, and .66 for social integration in both years.

The numbers associated with the lines connecting the ovals in the structural model are path coefficients, interpretable as standardized regression (beta) weights. They reflect both the direction and relative strength of the influence of one latent construct on another, controlling for all causally and temporally prior variables.

Overall, the LISREL model for men produced an R^2 of .05 for the freshman year and .21 for the sophomore year, indicating that about one-fifth of the variance in the final dependent variable (academic growth reported in the sophomore year) was explained by the model. The overall Goodness-of-Fit Index was .91, indicating a moderately high degree of fit between the observed covariance matrix and that predicted by the structural model (X^2 = 198, d.f. = 169).

The path coefficients in the model suggest that the men's background characteristics used in this study had, at best, a weak influence on their reported academic integration. Indeed, the path from RANK to academic integration was non-significant, as indicated by the parentheses around the coefficient. Moreover, recall that students' race/ethnicity, academic aptitude and parents' formal education had already been excluded because preliminary analyses indicated they were unrelated to other variables in the model.

The results also indicate, as expected, that men's levels of academic integration in the freshman year had a direct effect on academic integration in the sophomore year, and that these integration levels in both years were related to reported academic skill development.

Additionally, and consistent with theoretical expectation, reported freshman year academic growth had a direct effect on men's levels of academic integration during the sophomore year. Of particular interest is the fact that freshman year academic integration level has an indirect effect (.34) on reported sophomore year academic growth in three ways: 1) through sophomore year academic integration; 2) through freshman year growth to sophomore year growth, and 3) through freshman year growth to sophomore year academic integration to sophomore year growth. Indeed, the sum of these indirect effects indicates that freshman year academic integration may have as great an influence on reported sophomore year growth as it does on reported freshman year development.

Freshman year social integration levels influenced sophomore year social integration levels, but contrary to theoretical expectations, in neither year was men's social integration reliably related to their reported academic growth. Moreover, the hypothesized reciprocal path between academic and social integration failed to emerge in either year.

The LISREL model developed for women is given in Figure 3 and accounted for 14 and 27 percent of the variance in reported academic growth during the freshman and sophomore years, respectively. The Goodness-of-Fit Index was .93 (X^2 = 209, d.f. = 171). Alpha reliabilities for the latent trait variables in this model were .67 and .73 for freshman and sophomore year academic integration, respectively, and .58 and .65 for social integration in the same two years.

As among the men, women's background traits are not particularly strong influences on freshman year academic integration. Moreover, the relations hypothesized between academic integration levels and between them and reported academic growth in the two years were supported by the

analysis. In contrast with the men, however, social integration among women had a reliable, if slight (.07), effect on reported freshman year academic skill acquisition, but no similar effect was apparent in the sophomore year. Moreover, the expected effect of reported freshman year growth on sophomore year academic integration level, identified in the men's model, did not emerge in the analysis for women.

Additionally, the anticipated reciprocal relation between academic and social integration levels in the two years did not emerge, although a unidirectional relation was identified, however: academic integration among women appears to influence social integration levels, but only in the freshman year.

Thus, the effect of academic integration level on reported freshman year academic growth appears to be both direct (.48) and indirect, albeit modest (.024), through freshman year social integration. Academic integration had a significantly (seven times) more powerful influence than social integration on reported freshman year growth, but the magnitude of the effect dropped by half in the sophomore year, where the largest effect was exerted by reported freshman year growth.

As was the case with the men, women's freshman year academic integration appears to have a substantial indirect effect (.39) on sophomore year growth, an effect that is nearly (about 80 percent) as powerful as its direct effect on reported freshman year growth (.48). Freshman year academic integration's indirect influence derives primarily from two sources: 1) its relatively strong direct influence on sophomore year academic integration (.75) and that variable's effect (.24), in turn, on reported sophomore year growth, and 2) the path from freshman

year academic integration through freshman year growth (.48) and that variable's effect (.44) on sophomore year development.

Perhaps the most interesting finding for the women's analysis was the negative direct effect (-.12) of freshman year social integration level on sophomore year academic integration. It would appear that a woman student's involvement in the social systems of an institution in her first year may constrain sophomore year integration in the academic system, and, consequently, her academic skill development, by some slight amount.

Limitations

This study is limited in several respects. First, the results are based on the responses of students at a single institution. To the extent that these students and their experiences during four years of college differ from those at other institutions, the results reported here may not be generalizable beyond the university at which the study was conducted.

Second, students' self-reported perceptions of their academic skill development was the criterion measure in this study, and it is not known how precisely students' self-reports of growth, using this particular instrument, may correspond to more objective developmental measures. It is worth noting, however, that Pace (1985) has cautioned against dismissing students' self-reports as invalid or biased. According to Pace, "All the evidence that we have indicates that college students are conscientious and generally accurate reporters . . . and that their judgments of what they have gained are consistent both with external evidence, when it exists, and with what we might expect in the light of

their activities and interests" (1985, p.13). Elsewhere, Pace (1984, pp. 34-38) reports evidence on this point.

Third, due to limitations on the nature of the background information available on respondents in this study, the role of background traits may be underestimated. This study relied on fairly standard admissions information (e.g., race/ethnicity, academic aptitude and achievement., parents' education, degree aspirations), some of which was excluded because of indications it was unrelated to any element of the model being tested. Future studies of this sort should include measures of students' pre-college personal and academic characteristics that are likely to be more directly related to student learning (e.g., students' readiness to learn, learning styles, and motivations for learning). As Pace (1985) has suggested, it would also seem advisable to include some measure of the effort students expend in their pursuit of learning. It might also be informative to monitor how these characteristics vary during the course of students' collegiate careers.

Fourth, the present model probably constitutes a less than fully-specified representation of Tinto's constructs of academic and social integration. Future research should include additional measures of those constructs, such as indicators of students' academic values, the degree of value consensus with faculty and other students, as well as possible changes in students' willingness and readiness to learn.

Finally, as noted, the model tested in this study contained only marginal operational representations of Tinto's concepts of institutional and personal goal commitments, whether at the time of matriculation or subsequent to the collegiate experiences of each year. While the exclusion of some measure of institutional commitment probably has had

little effect on the results reported, the effects of omitting measures of students' levels of commitment to a variety of educational and vocational goals is harder to estimate. While the analysis of students' reported growth over the two-year period represents an important contribution to our understanding of how men and women students grow academically, that contribution may be diminished to an unknown extent by the absence of fuller specification of these particular concepts.

SUMMARY AND CONCLUSIONS

The analyses reported here suggest that men and women may develop their academic skills at different rates during the first two years of college and that the sources of influence on that reported growth, while similar in certain respects, are strikingly different in others. Not only did the women in this study report significantly more academic skill development than in the sophomore year, but they also appeared to experience higher levels of social integration than men during the freshman year, a condition that may, in fact, work to constrain their sophomore year academic integration and, as a consequence, their academic growth in that year as well.

Moreover, freshman year academic integration emerged as a critical variable in the academic growth reported by both sexes. Not only did academic integration have statistically reliable direct effects on reported growth for both sexes in both years, but freshman year academic integration had as great (for men), or nearly as great (for women), an influence --indirectly-- on reported sophomore year growth as it had directly on freshman year growth.

The results of this study afford only moderate support for the validity and utility of Tinto's (1975) model for the study of educational outcomes other than attrition. In the present study, the model's weaknesses would appear to be primarily in its conception of the role of social integration in students' academic development. Among men, social integration in both years was independent of both academic integration and reported growth. Among women, it was only modestly related to freshman year growth and negatively related to sophomore year academic integration. Similarly, and perhaps related to that set of findings, little evidence was found in this study to support the expected reciprocal relations between academic and social integration levels in either of the two years.

It is possible, of course, that the variables used in this study are simply inadequate to the task. Or one might argue that no real basis exists for expecting students' social involvement to have any significant bearing on their academic growth. As noted earlier, however, there are both conceptual and empirical reasons for such expectations.

Alternatively, social integration may in fact be an irrelevant consideration in students' academic learning during the first two years of college. Indeed, in Terenzini and Wright's (in press) four-year study, social integration emerged as a salient influence in the junior year and, by the senior year, had as much influence on reported academic growth as did academic integration levels.

While further research will be needed to clarify and substantiate these findings, they strongly intimate that the academic growth of women during the first two years of college is substantively different and more complex than that of men. Whereas the academic development reported by

men appears to be independent of their involvement in the social systems of the institution, freshman year social integration among women may simultaneously promote freshman year growth and constrain sophomore year academic involvement and, thereby, academic growth. This paradoxical finding may be functionally related to the fact that time is a finite commodity: the more time a student invests in an institution's social systems, the less time there will be for academic involvement. The evidence concerning these dynamics among women are, of course, consistent with conceptions of human behavior as a function both of the interaction of individuals and their environments and of the interactions of cognitive and affective dimensions within individuals. Whether this and subsequent research will indicate a need to devise different models of academic growth for men and among women remains to be seen.

From a practical standpoint, the results suggest that significant attention should be given in academic and student affairs to programs (orientation and otherwise) to introduce both men and women students early to the academic systems of the institution. Freshman year academic integration levels were found to have a significant and direct positive influence on reported freshman year academic growth for both men and women, but also, indirectly, an equivalent influence (or nearly so) on sophomore year development. The suggestion is clear that academic integration levels in the early years may be cumulative, and the greater the level of academic integration in the first year, the greater the potential for academic development in that and succeeding years.

It is important to note, here, that "academic integration" in this study is heavily influenced by students' contacts with, and reactions to, faculty members (see Table 1 and the variables operationalizing "academic

integration"). The clear implication is that faculty members must be involved early and significantly in students' introduction to, and enculturation into, the institution's academic systems.

That influence extends beyond the classroom, however, to faculty members' informal interactions with students. Those contacts may occur in a variety of settings (e.g., academic advising, informal socializing, personal or career counseling/advising), and it would seem that institutions may have to take greater note of the faculty's influence in such settings and both facilitate and reward it.

Finally, the results suggest a need for careful and coherent program planning in both academic and student affairs areas. At least for women, experiences thought to promote personal growth also appear to influence academic development. Although this study produced no reliable evidence to support such synergy among men, neither can one conclude that such forces are not at play. In the end, it would seem educationally prudent for both academic and student affairs administrators to ensure that full advantage is taken of opportunities for both cognitive and affective growth among students.

NOTE

1. One of LISREL's advantages is its ability to control for correlated error terms among variables and for the correlation of a measure with itself over time, thus producing relatively unbiased path estimates compared to what is possible with OLS regression procedures. In the interest of parsimony in Figures 2 and 3, and because the path estimates, and not the degree of correlation among

error terms or repeated measures, was of primary interest in this study, those correlations are not reported. The point, here, is that such correlations, which can confound the interpretation of OLS path coefficients, have been controlled in this study.

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