

Freshman Decidedness Regarding Academic Major and Anticipated and Actual Adjustment to an Engineering College

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The relation between freshman decidedness regarding academic major and self-assessed anticipated and actual adjustment to an engineering college was investigated. Positive relation was found between decidedness regarding academic major and both anticipated adjustment (measured prematriculation) and actual adjustment (measured postmatriculation). The relation was clearer postmatriculation than prematriculation and was strongest for academic adjustment and weakest for social adjustment. There does not seem to be much consequence of changing from one engineering science major to another available at the same institution. However, change to a major not available at the same institution is associated with lower adjustment scores. Comparing findings from the present study with data from an earlier investigation, it is conjectured that the relation between decidedness and freshman adjustment to college may be stronger in engineering than in liberal arts.

This study grew out of a previous investigation of freshman decidedness regarding academic major and adjustment in a liberal arts college (Smith & Baker, 1987). The expectation of relation between major decidedness and adjustment to college is based on the assumption that having a sense of direction and purpose as one begins a venture requiring considerable time, effort, and expense will have beneficial consequences for how one feels about oneself in that undertaking and how one adapts to it.

Several researchers have established association between major decidedness and behavioral indices of adjustment to college. They have found positive relation with grade point average or number of credits earned (Chase & Keene, 1981; Foote, 1980; Smith, 1977; Theophilides, Terenzini, & Lorang, 1982; Warren, 1961; Weitz, Clark, & Jones, 1955) and inverse relation with dropping out of college (Abel, 1966; Elton & Rose, 1970; Foote, 1980; Titley & Titley, 1980). Other investigators report that decidedness is related to various test indices of adjustment to college. It is associated positively

with degree of comfort in being in an academic environment (Swanson & Hansen, 1985), positively with institutional attachment and goal commitment during the freshman year (Theophilides, Terenzini, & Lorang, 1984), and negatively with experiencing anxiety in the adjustment to college (Hawkins, Bradley, & White, 1977; Kimes, 1974; Walsh & Lewis, 1972).

Several researchers report association between decidedness and indices from the Student Adaptation to College Questionnaire (SACQ) (Baker & Stryk, 1989), the instrument employed in the present study to measure adjustment. For Smith and Baker (1987), decidedness was associated with better adjustment, especially in the academic area and institutional attachment. Furthermore, the relation was more pronounced in the second freshman semester than the first. Savino, Reuter-Krohn, and Costar (1986) found significant positive relation between having a major and academic and personal-emotional adjustment in both semesters and institutional attachment in the second semester. In a study done in the second half of a fall term, Albert (1988) obtained significant findings for academic adjustment, personal-emotional adjustment, and institutional attachment. McGowan (1988) found significant relation between certainty of major and academic adjustment. From studies that used only the Full Scale score of the SACQ, Allen (1985) reported a positive relation between that measure and certainty of major, while Martin (1988) found no difference between students with and without majors.

The present study differs from most previous investigations in several ways. First, it examines major decidedness and adjustment in an engineering college specifically. Second, major status is defined in terms of stability over time rather than cross-sectionally at a particular point in time. Third, a measure of anticipated or expected adjustment taken prior to matriculation is employed, as well as one of actual adjustment taken postmatriculation.

Method

Subjects

The study was conducted at Worcester Polytechnic Institute (WPI), a central Massachusetts college of engineering and science. Participants were 515 freshmen (357 males, 158 females).

Materials

The means for measuring anticipated (pre-matriculation) and actual (postmatriculation) adjustment to college were two closely related instruments. The latter, the SACQ (Baker & Siryk, 1989), is a self-report, Likert-type scale consisting of 67 items. Each item is a statement pertaining to one of many aspects of the experience of adjusting to college and how the student is coping with the aspect in question. Students are asked to assess on a 9-point scale the degree to which the statement applies to them.

An Academic Adjustment subscale contains 24 items referring to educational demands characteristic of the college experience (e.g., "Recently I have had trouble concentrating when I try to study"). A Social Adjustment subscale has 20 items relevant to interpersonal-societal demands (e.g., "I am meeting as many people and making as many friends as I would like at college"). Fifteen items address physical and psychological feeling states and constitute a Personal-Emotional Adjustment subscale (e.g., "I have been feeling tense and nervous lately"). An Institutional Attachment/Goal Commitment subscale consists of 15 items relating to feelings about being in college in general (e.g., "I am pleased now about my decision to go to college") and at the college of attendance in particular (e.g., "I wish I were at another college or university").

No overlap of items occurs on the Academic, Social, and Personal-Emotional Adjustment subscales. However, the Attachment subscale contains 8 items from the Social Adjustment subscale and 1 from the Academic Adjustment subscale. The sum of individual item scores within each subscale yields an index for each of the four aspects of adjustment. The sum of scores for all 67 items—the Full Scale score—yields an index of overall adjustment. Higher scores indicate better adjustment.

Considerable information concerning the reliability and validity of the SACQ has been accumulated and is presented in detail elsewhere (Baker & Siryk, 1989).

The measure of anticipated adjustment employed was the Anticipated Student Adaptation to College Questionnaire (ASACQ) (Baker, McNeil, & Siryk, 1985). The ASACQ is the SACQ adapted to elicit prematriculation predictions as to how incoming students expect to feel about themselves and their college adjustment 6 or 7 weeks following matriculation. It has the same number of items as the SACQ, with essentially the same item content except for tense changes.

A five-item questionnaire was designed to acquire information regarding academic major status:

- (a) retrospectively, whether the student had a major at the time of application to college;
- (b) if so, the name of the major;
- (c) whether the student had the same major now (i.e., at the time of a spring or fall testing) as at time of application;
- (d) the name of the new major if a change had taken place; and
- (e) on a 9-point scale, degree of certainty that the major at time of graduation would be the same as presently.

Procedure

The ASACQ and academic major questionnaire were mailed from the Student Counseling Center to all 752 incoming freshmen in late May. A follow-up letter was sent a week later. A cover letter explained that participation was voluntary and that all data would be treated with strict confidentiality. By mid-June, completed questionnaires were received from 515 students.

During the 7th week of Term A (WPI's academic year is four 7-week terms, A through D), in mid-October, the SACQ and major questionnaire were sent to the 515 students who returned the spring mailing. Following an 8-day break, at the start of Term B the questionnaires were sent again to those freshmen who had not yet responded. By mid-November, 262 completed questionnaires were received (168 males, 94 females).

Results

Reliability data

Alpha coefficients for the ASACQ and SACQ in the present study are, respectively, .81 and .86 for the Academic Adjustment subscale, .84 and .89 for the Social Adjustment subscale,

.73 and .82 for the Personal-Emotional Adjustment subscale, .88 and .88 for the Attachment subscale, and .91 and .94 for the Full Scale.

Prematriculation major status and anticipated adjustment to college

Forty-two students had had no major at the time of application and still had no major at the time of the prematriculation spring testing (undecided). Forty-nine students switched from one major to another available at WPI (unstable major). Four hundred and twenty-four students indicated the same major for both times (stable major). The expectation was that the more decided and stable a student's educational plans, the more confident he/she would feel about the impending adjustment to college as measured by the ASACQ.

Thus, it was predicted that the undecided group would have the lowest ASACQ scores and the stable major group the highest. Students in the unstable major group were expected to be intermediate, closer to the stable major group. It was also expected that the findings would be clearest for the Academic Adjustment and Attachment subscales. This latter expectation was based on the assumption that those two subscales measure the aspects of adjustment to college most vulnerable to variations in settledness of educational plans.

A multivariate analysis of variance (MANOVA) was performed among the three major status groups and all ASACQ indices. Using Wilks criterion, a significant effect for group was found, $F(8, 1523) = 3.84, p \leq .01$. A univariate analysis of variance (ANOVA) was then done for each ASACQ measure. Significant differences were found for the Academic Adjustment and Personal-Emotional Adjustment subscales and the Full Scale (see Table 1). As expected, the stable major group had the highest mean, the unstable major group the next highest, and the undecided group the lowest. This pattern also obtained for the Attachment and Social Adjustment subscales but was not statistically significant.

For a somewhat finer analysis, a Pearson product moment correlation was performed between the major certainty rating for students having a major and each ASACQ index ($n = 473$). The foregoing analysis by categories focused on presence or absence of major. The newer, correlational analysis focuses on degree of decidedness about major among students who in the former analysis were undifferentiated. Even in this reduced and substantially more homogeneous sample there were significant positive correlations between major certainty, on the one hand, and, on the other, the Academic Adjustment subscale, $r = .17, p < .01$, and the Full Scale, $r = .13, p \leq .05$.

TABLE 1
Analysis of Variance on Anticipated Student Adaptation to College Questionnaire
(ASACQ) Scores for Students Varying in Academic Major Status

Major Status	n	Academic Adjustment		Social Adjustment		Personal-Emotional Adjustment		Attachment		Full Scale	
		M	SD	M	SD	M	SD	M	SD	M	SD
(A) Undecided	42	143.2	20.7	134.7	25.3	87.9	12.3	109.9	12.9	448.3	54.6
(B) Unstable Major	49	153.5	18.2	136.7	20.3	92.4	16.6	111.3	12.9	472.4	58.7
(C) Stable Major	424	159.6	21.7	141.2	19.0	94.7	17.2	112.1	12.8	479.8	59.5
F (2,512)		12.20**		2.92		3.32*		.59		7.24**	
Significant differences among groups within each ASACQ index, using Fisher Least Significant Difference post-hoc tests:											
		A v. B*				A v. C**				A v. B*	
		A v. C**								A v. C**	
*p < .05 **p < .01											

Postmatriculation major status and actual adjustment to college

For the postmatriculation data, 17 students had no major prematriculation (i.e., at time of application or spring testing) and still had no major at the time of fall testing (undecided). Twelve had no major prematriculation but had decided upon one available at WPI by the fall testing (newly decided). Six students had an institution-appropriate major prematriculation but by fall testing had decided upon a major not available at WPI (*WPI-inappropriate* shift). Thirty-six switched from one major to another at WPI (*WPI-appropriate* shift). One hundred and ninety-one students had the same major both *pre-* and postmatriculation (*stable* major). The expectation was that SACQ scores would be arrayed from lowest to highest across these five categories in the order listed, related to degree of decidedness or stability of major status represented in each category.

A MANOVA was performed among the five major status groups and all SACQ indices. Using Wilks criterion, a significant effect for group was found, $F(16, 777) = 3.07, p < .01$.

ANOVAs were then performed for each SACQ measure. Significant differences were found for the Academic and Personal-Emotional Adjustment subscales, the Attachment subscale, and Full Scale (see Table 2).

The expected array of scores across groups was largely found, with some exceptions. The first exception, a minor one, was that there were no significant differences between the *WPI-appropriate* shift and *stable* major groups (see Table 2).

A more noteworthy exception was that the *WPI-inappropriate* shift group, instead of being intermediate, had the lowest scores on four of the five indices. This suggests that the fact that a major for which a student has opted is not available at the institution attended may negatively override any advantages for adjustment to college that having a major may provide. This finding will be discussed later.

Excluding the *WPI-inappropriate* shift group, post hoc analyses revealed numerous significant differences among the remaining groups, all in the expected direction (see Table 2).

TABLE 2
Analysis of Variance on Student Adaptation to College Questionnaire (SACQ) Scores for Students Varying in Academic Major Status

Major Status	n	Academic Adjustment		Social Adjustment		Personal-Emotional Adjustment				Attachment		Full Scale	
		M	SD	M	SD	M	SD	M	SD	M	SD		
(A) Undecided	17	124.5	17.5	113.8	20.1	86.1	18.4	95.6	15.9	380.0	52.8		
(B) Newly Decided	12	136.2	15.8	116.7	29.3	86.3	13.5	104.7	15.6	400.6	52.1		
(C) WPI-Inappropriate Shift	06	122.3	11.1	125.2	26.8	74.0	19.9	92.8	24.6	369.0	60.2		
(D) WPI-Appropriate Shift	36	149.3	24.7	127.9	24.5	98.2	17.3	106.5	19.8	436.6	60.7		
(E) Stable Major	191	149.0	23.9	129.8	15.1	95.1	18.4	109.5	16.9	435.9	61.6		
F (4,257)		6.70**		2.24		3.85**		3.79**		5.70*			
Significant differences among groups (excluding Group C) within each SACQ index, using Fisher Least Significant Difference post-hoc tests:													
		A v. D*		A v. D*		A v. D*		A v. D*		A v. D**			
		A v. E*		A v. E**		A v. E*		A v. E**		A v. E**			
		B v. D*				B v. D*				B v. D*			
		B v. E*				B v. E*				B v. E*			
*p < .05		**p < .01											

As with the prematriculation data, a Pearson product moment correlation was performed between the rating of major certainty for students with majors and each SACQ index, excluding students whose new major was not available at WPI ($n = 239$). There were significant positive correlations for the Academic Adjustment subscale ($r = .37, p < .01$), the Social Adjustment subscale ($r = .13, p < .01$), the Personal-Emotional Adjustment subscale ($r = .20, p < .01$), the Attachment subscale ($r = .23, p < .01$), and the Full Scale ($r = .30, p < .01$).

Discussion

Results of this study clearly support the hypothesized positive relation between decidedness regarding academic major in freshmen and adjustment to college. This is consistent with findings of earlier investigations. However, the study also provides several refinements to and extensions of knowledge about the relation.

This study is the first to examine the relation between major status and students' prematriculation expectations concerning their adjustment to the impending college experience. Students without majors at the time of application and at the time of testing in the spring before starting college—i.e., the most **undecided**—have the lowest anticipated adjustment scores. Students who have majors at the time of application, and who either persist with the same major at the time of the spring testing or change to a new major available at the college to be attended, have higher anticipated adjustment scores. Thus, decidedness about major seems to have implications for the degree of confidence with which a student faces the imminent experience of adjusting to college, especially in its academic aspects.

Another notable feature is that this study examines major decision status in terms of stability over time. That time period ranges from application (sometime prior to February 15, the application deadline), through a prematriculation testing (between late May and mid-June), to a fall testing (mid-October to mid-November). Thus, major status is defined not only in terms of whether a student has a major and the degree of certainty about the major but also whether there is change over time.

Findings indicate a clear relation between stability of major status over time and adjustment to college. Students with no major pre- or postmatriculation—the most undecided—have low adjustment-to-college scores. Students who

have no major prematriculation, but do **postmatriculation**—i.e., those having made a recent decision regarding major—have higher adjustment scores than those still without majors, though not significantly. Students who keep the same major over the entire time covered by the study, or who change to another major available at the college attended, have the highest adjustment scores.

It is interesting to note that, for both anticipated and actual adjustment, there were no significant differences between students changing major to another available at the present college and students keeping the same major. It had been expected that the degree of instability represented in changing major would be reflected in lower adjustment scores for the former students. A possible reason for the lack of difference is that all changes were among engineering fields, computer science, natural sciences, and mathematics. Such shifts may not involve much change in basic academic orientation or goals, only varying emphases within the "science" area. Possibly, students switching among such majors available at the same institution do not experience the psychological dislocation that may result from shifts among more disparate major fields.

Students who have majors prematriculation but subsequently change to majors *not* available at the engineering school have unexpectedly low adjustment-to-college scores. This finding must be regarded as tentative, however, due to the fact that there were only 6 students in this group. In the fall testing such students had the lowest adjustment scores for all but one adjustment index. It was originally **expected**—assuming positive relation between degree of decidedness and adjustment—that this group would be intermediate between formerly undecided students who had made a recent decision and students changing to an alternate major at WPI. In retrospect, this thinking may not properly have taken into account the probable large psychological dislocation involved in changing to a major that requires moving to another institution.

It is interesting and important to note that the relation between major status and adjustment to college can still be seen when looking only at students with majors, focusing on the degree of certainty that such students have about their majors. Even with this more homogeneous group, correlational analysis shows significant positive values.

The relation between major status and adjustment to college in this study is seen most clearly in academic adjustment and next most clearly in personal-emotional adjustment for both anticipated and actual adjustment. It is seen in goal commitment/institutional attachment only for actual adjustment and least of all in social adjustment. Smith and Baker (1987), Savino, et al. (1986), and Albert (1988/1989) likewise found the strongest relation between major status and academic adjustment, significant relations also with institutional attachment and personal-emotional adjustment, but not at all for social adjustment. Thus, there seems to be a pattern across studies for major status to be most strongly related to academic adjustment and least strongly to social adjustment. This makes sense in that academic adjustment is the area for which a student's educational planning is most relevant, and social adjustment the area for which educational planning is least relevant.

It is worthwhile noting, however, that while previous investigators found no significant relation between major status and social adjustment to college, the present study did. It is also interesting to note that clearer relation was found in the present study than in earlier studies using the SACQ between major status and adjustment to college in the first semester of the freshman year. These two findings—the suggested greater pervasiveness of effect through the several areas of adjustment and the earlier appearance of effect in the engineering college—may be a result of the different kinds of institutions studied. It may be conjectured that decidedness about major is a more salient and important consideration in the life of an engineering freshman than a liberal arts freshman. In a highly specialized institution like an engineering college, major status is more closely related to a choice of occupation than it is at a liberal arts institution, and there is probably a lot more thinking or decision-making about an academic major before matriculation. Postmatriculation, the highly structured nature of the engineering curriculum undoubtedly places a heavy burden on the major-uncertain student. Liberal arts students, on the other hand, are encouraged to explore other fields in a more flexible curriculum, making major uncertainty more tolerable or even advantageous.

Because this study is the only one to date using the SACQ to investigate the relation between major status and adjustment to an engineering college, replication in other such in-

stitutions would be highly desirable to test the findings reported here. Also desirable would be to extend the limits of the present study beyond the first semester of the freshman year in order to investigate further the longer term implications of major status.

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