Journal of Student Financial Aid

7-1-1991

Does Financial Aid Make Students Consider Colleges with a Wider Cost Range?

Thomas A. Flint

Follow this and additional works at: https://ir.library.louisville.edu/jsfa

Does Financial Aid Make Students Consider Colleges with a Wider Cost Range?

by Thomas A. Flint

A reanalysis of American College Testing Program data (Munday, 1976) using multiple regression techniques found systematic relationships between student ability, family income, and college choice set characteristics with the budget, selectivity, and affluence characteristics in the college attended for a general college-bound sample but not for a similar sample of students who had applied for financial aid. Contrasts are drawn to other college choice research findings and implications of the study are discussed.

I n recent years college choice has become a subject of increased research. It is the focal point of several interests within higher education. Federal policymakers are concerned with the impact of federal student financial aid programs. State officials want to understand the factors related to aggregate enrollments in the public and private sectors. College recruiters want to maximize their applicant pool and yield in an era of declining numbers of graduating high school seniors.

Hossler, Braxton, and Coopersmith (1989) conclude from their extensive review of college choice research that several important limitations exist in the current literature. With regard to the impact of financial aid on college choice, many studies are limited to a single institution (Chapman, 1979; Fields & LeMay, 1973; Jackson, 1978; Litten, Sullivan, & Brodigan, 1983; Maguire & Lay, 1981; Muffo, 1987; Welki & Navratil, 1987). Studies not limited to a single institution have often focused on a single region of the country or on individual states (Bean & Centra, 1973; Fenske, Boyd, & Maxey, 1979; Tierney, 1980; Zemsky & Oedel, 1983). Other studies of the impact of financial aid on college choice often concentrate on high ability students (Chapman & Jackson, 1987; Freeman, 1984). Most large, multi-institutional or national samples use student surveys or direct questionnaires to collect some limited college choice data (Aslanian & Brickell, 1988; Cowart, 1988; National Center for Education Statistics, 1988), although a few have drawn on archival records of test score submissions (Bean & Centra, 1973; Zemsky & Oedel, 1983). Several researchers in college choice have commented on the lack of appropriate and reliable data on college characteristics compared to the richness of student data (Hearn, 1984; Hossler, Braxton, & Coopersmith, 1989).

Summarizing the findings across many studies, Hossler, Braxton and Coopersmith (1989) conclude that the effect of institutional financial aid on college choice is weak to moderate, but that most of the evidence on the impact of aid focuses on high-ability students: "Little is known about the impact of financial aid on less talented students" (1989, p. 274).

Thomas A. Flint is Vice President of Enrollment Management at Robert Morris College in Chicago.

When family income is positively correlated to college costs, high-income students apply to and attend high cost colleges and low-income students gravitate to low-cost colleges. Additionally, when the range of college costs being considered narrows, then the correlation with family income becomes higher (approaching +1.0). Consequently, if one of the goals of student financial aid is to increase choice, the most meaningful sense of that term would *not* be more student applications to colleges all having the same narrow range of costs, but rather would be the addition of colleges with costs *unlike* those already considered. Then, when the range of variation in costs expands, the correlation weakens (approaching 0.0). Specifically, if one goal of student financial aid is to promote choice, it should enable lower income students to attend higher cost colleges. In this regard, promoting choice has two aspects. First, student college choice sets become less homogeneous as choice expands. Second, choice sets which are more varied make prediction of the characteristics of the attended college more difficult. In other words, with expanding choice neither the kinds of colleges considered nor the attributes of the colleges attended are easy to predict.

So far, only family income and college costs have been mentioned. Obviously, student ability is a major influence in college choice. The problem of estimating the effects of family income in the prediction of college choice is that income is not independent of student ability. Like family income, student ability is also positively correlated with higher costs in attended colleges. Because income and ability are positively correlated (Hearn, 1984; Munday, 1976), and because neither can be experimentally manipulated, one must rely on modern statistical techniques such as multiple regression to isolate their joint and separate influences on other variables. Multiple regression enables us to estimate the influence of a given variable, *net* of the influence of all other variables estimated simultaneously, on some measured outcome. Thus, one can estimate the effect of family income on the costs of the colleges chosen to attend, net of student ability levels and other variables. Similarly, one can estimate the effect of student ability on the chosen colleges' selectivity levels (operationally defined as the average of tested ability levels for students attending), net of family income, and other variables. Because it statistically removes the effects which cannot be uniquely attributed to separate variables, multiple regression is considered to be a conservative analytic technique.

The current study is a reanalysis of data reported by Munday (1976). That study investigated the relationships between student ability, family income, college budgets, financial aid, and college characteristics among students' choice sets and attended colleges. Some unique aspects of that data include the fact that it is a multi-institutional study, is not limited to higher ability students, and relies on archival records that are less prone to distortion (Webb *et al*, 1966). However, Munday (1976) conducted only exploratory analyses and did not use multivariate techniques to determine which of the student background or college choice set characteristics might

"With expanding choice neither the kinds of colleges considered nor the attributes of the colleges attended are easy to predict."

predict the features of the college attended. Thus, this reanalysis is intended to explore the predictive value of these data on the formation of a set of potential colleges and of actual attendance.

Samples and Data

Data in the form of correlation tables were drawn from Munday (1976) and are reproduced here as Tables 1 & 2. In that study, two data sets were constructed. The first data set was identified as a general college-bound student group. The students were mostly first-time freshmen in fall 1972 who had written the American College Testing Assessment in 1971-72 as high school seniors. The colleges in which they enrolled provided their names on lists for the ACT Class Profile Service, and from these lists every tenth name was pulled for constructing the data set. The ACT Class Profile Service data included the students' estimated family income, ACT Composite scores, and the first, second, and third choice colleges ranked by each student prior to enrollment. It should be noted in passing that estimates of family income are the only data collected here directly by the survey technique. The college characteristics of mean ACT Composite score and the percent of the student body from family incomes over $9,000 were drawn from the group statistics in the Class Profile Service. The college budget data were obtained from the ACT Student Assistance Program files, using the college budgets that each college had submitted to ACT for use in determining financial need. The budget data included tuition, room, board, and supplies for a 9-month academic year. For purposes of analysis Munday (1976) assumed a typical (unadjusted) budget for in-state residents, living on campus, attending full-time as dependent students. Based on these considerations, the data set included 33,754 students at 1,497 colleges. Munday (1976) indicated that the data set was probably reasonably representative for the Midwest, South, and West regions.

The second sample included the same sources for the student and college characteristics as the first sample. Like the first sample, the students selected were freshmen in fall 1972. However, in the second sample students had both ACT Assessment and ACT Student Assistance Program records, the latter being an indication that they were applying for financial aid. The sample had previously been drawn for another study (MacMahon and Wagner, 1973) and was drawn to overrepresent students of non-white racial background. The authors included tables which show that whites composed 76 percent, blacks 13 percent, and others 11 percent of their sample, respectively, whereas the most recently preceding U.S. Census at that time indicated whites comprised 89.3 percent, blacks 9.7 percent, and other races 0.9 percent of the population (1973, p. 8). However, the authors further showed that the reported incomes in this second sample varied in the distribution across six income levels by no more than 4 percentage points for each range when compared to prior U.S. Census data (1973, p. 6). This second sample contained 2,384 student records.

TABLE 1
Means, Standard Deviations, and Correlations for General College-Bound Students from Munday (1976)

1 = Students' Family Income
2 = Budget at College Attended
3 = Budget at 1st Choice College in Choice Set
4 = Budget at 2nd Choice College in Choice Set
5 = Budget at 3rd Choice College in Choice Set
6 = Students' ACT Composite Score
7 = Mean ACT Composite Score at College Attended
8 = Mean ACT Composite Score at 1st Choice College in Choice Set
9 = Mean ACT Composite Score at 2nd Choice College in Choice Set
10 = Mean ACT Composite Score at 3rd Choice College in Choice Set
11 = Percent of Student Body above $9,000 Family Income at College Attended
12 = Percent of Student Body above $9,000 Family Income at 1st Choice College
13 = Percent of Student Body above $9,000 Family Income at 2nd Choice College
14 = Percent of Student Body above $9,000 Family Income at 3rd Choice College

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Mean	4.8	2.2	2.4	2.3	2.3	20.6	20.1	20.7	20.6	20.5	38.0	40.0	40.0	39.0
Standard Deviation	2.0	0.9	0.9	0.9	0.9	5.3	2.8	2.7	2.6	2.7	10.0	10.0	10.0	10.0
1	1.00													
2	.07	1.00												
3	.05	.21	1.00											
4	.09	.20	.20	1.00										
5	.04	.18	.14	.21	1.00									
6	.22	.17	.09	.10	.08	1.00								
7	.23	.36	.14	.13	.11	.46	1.00							
8	.15	.13	.34	.14	.09	.29	.31	1.00						
9	.16	.13	.15	.35	.13	.27	.33	.32	1.00					
10	.15	.12	.12	.13	.36	.27	.31	.28	.30	1.00				
11	.30	.06	.03	.03	.03	.18	.39	.12	.11	.10	1.00			
12	.22	.01	.04	−.03	.00	.15	.13	.45	.06	.09	.31	1.00		
13	.22	.00	.01	.05	.00	.13	.11	.10	.46	.07	.30	.34	1.00	
14	.19	.01	.01	.02	.07	.14	.11	.08	.08	.49	.28	.26	.27	1.00

TABLE 2
Means, Standard Deviations, and Correlations for College-Bound Financial Aid Applicants from Munday (1976)

1 = Students' Family Income
2 = Budget at College Attended
3 = Budget at 1st Choice College in Choice Set
4 = Budget at 2nd Choice College in Choice Set
5 = Budget at 3rd Choice College in Choice Set
6 = Students' ACT Composite Score
7 = Mean ACT Composite Score at College Attended
8 = Mean ACT Composite Score at 1st Choice College in Choice Set
9 = Mean ACT Composite Score at 2nd Choice College in Choice Set
10 = Mean ACT Composite Score at 3rd Choice College in Choice Set
11 = Percent of Student Body above $9,000 Family Income at College Attended
12 = Percent of Student Body above $9,000 Family Income at 1st Choice College
13 = Percent of Student Body above $9,000 Family Income at 2nd Choice College
14 = Percent of Student Body above $9,000 Family Income at 3rd Choice College

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Mean	3.6	2.3	2.3	2.3	2.4	19.8	19.6	19.5	20.0	19.9	36.0	36.0	37.0	37.0
Standard Deviation	1.9	0.9	0.9	0.9	0.9	6.0	2.6	2.5	2.7	2.6	10.0	10.0	10.0	10.0
1	1.00													
2	.03	1.00												
3	.17	−.02	1.00											
4	−.01	−.02	.22	1.00										
5	.08	−.17	.12	.22	1.00									
6	.35	.01	.13	.09	.10	1.00								
7	.04	.26	.01	−.15	−.03	.04	1.00							
8	.25	.03	.28	.07	.13	.43	.03	1.00						
9	.21	.03	.15	.30	.11	.37	.06	.43	1.00					
10	.29	.12	.01	.12	.17	.29	.04	.34	.29	1.00				
11	.01	.14	.01	−.06	.01	.04	.62	.02	.04	−.01	1.00			
12	.24	.01	.15	−.01	.01	.27	.02	.59	.22	.14	.00	1.00		
13	.19	.05	.03	.13	−.03	.24	.02	.23	.57	.17	−.02	.39	1.00	
14	.23	.03	−.03	−.08	−.03	.18	.07	.22	.07	.56	−.04	.31	.32	1.00

For simplicity of reference to the institutional characteristics under discussion in the remainder of this article, the college budget data will be referred to as *budget,* the mean ACT Composite score will be referred to as *selectivity,* and the percent of the student body above $9,000 in family income will be referred to as *affluence* (namely, affluence of the student body, not institutional wealth). Correspondingly, students' ACT Composite scores will be referred to as *ability.*

Analyses

The purpose of the analyses was to see how well the background characteristics and the choice set characteristics could predict the attended college characteristics, both for the general college sample and for the financial aid sample. Following the college choice models of others (Jackson, 1978, 1982; Hossler & Gallagher, 1987), the variables of family income and student ability were taken to be student background variables which precede the formation of the college choice set. Within the college choice set, each first, second, and third choice college preference, with the corresponding budget, selectivity, and affluence measures, was assumed to form part of the basis by which students evaluate and eventually select an institution to attend. While prospective college students cannot obtain measures of student affluence at colleges they consider in the same way they can for college budgets and selectivity, it is reasonable to believe that during campus visits they will draw inferences about socio-economic backgrounds from the appearances and behavior of enrolled students and they will judge whether or not they are comfortable among such students. The attended institution characteristics of budget, selectivity, and affluence are the variables to be predicted in this model. These blocks of variables are depicted in Figure 1.

For reasons reviewed earlier, least squares multiple regression was the statistical method used. Before explaining more about regression, two points must be made. First, not all the individual students in these two samples listed as many as three colleges in their choice sets. The significance of the results could be overestimated if the regression analysis used the full sample size in its statistical equations. Therefore, the analyses were done using the smallest possible number of subjects in correlations between variables in each sample, having accounted for blank or missing data. Thus, for the statistical equations the sample sizes were given as 6,930 for the general college bound sample and 254 for the financial aid sample (Munday, 1976).

Second, it is relatively easy when performing repeated predictive tests in large samples to obtain statistical significance merely by capitalizing on chance (Stevens, 1986). Thus, the criterion level for interpreting statistical significance in this study was set at a probability level of less than one in a thousand ($p < .001$). Combined with the point in the paragraph above and the earlier comments on multiple regression, it is evident that this is a very cautious approach to the analysis of this data.

The regression analyses performed on this data from Tables 1 and 2 are summarized in Tables 3 and 4, respectively, showing the predicted characteristics of the attended college (budget, selectivity, affluence) and their strengths of association with the other variables. A regression coefficient shows how much change is estimated to occur in the predicted variable for each unit of change in the predictor variable. The metric coefficient is stated in terms of the original unit of measure of the predictor variable (dollars, test score points, percentages) while the standardized coefficient is stated in terms of standard scores (standard deviation units). At the bottom of Tables 3 and 4 the R squared figures represent the percentage of the variability in the three observed attended college characteristics which may be attributed to the influence of the other variables collectively.

FIGURE 1

Background Characteristics	College Choice Set Characteristics	Attended College Characteristics
STUDENTS' FAMILY INCOME (1)	COLLEGE BUDGET AT 1ST CHOICE (3)	BUDGET AT COLLEGE ATTENDED (2)
STUDENTS' ACT TEST COMPOSITE SCORE (6)	COLLEGE BUDGET AT 2ND CHOICE (4)	COLLEGE MEAN ACT AT COLLEGE ATTENDED (7)
	COLLEGE BUDGET AT 3RD CHOICE (5)	% OF STUDENT BODY ABOVE $9,000 AT COLLEGE ATTENDED (11)
	COLLEGE MEAN ACT COMPOSITE AT 1ST CHOICE (8)	
	COLLEGE MEAN ACT COMPOSITE AT 2ND CHOICE (9)	
	COLLEGE MEAN ACT COMPOSITE AT 3RD CHOICE (10)	
	% OF STUDENT BODY ABOVE $9,000 AT 1ST COLLEGE (12)	
	% OF STUDENT BODY ABOVE $9,000 AT 2ND COLLEGE (13)	
	% OF STUDENT BODY ABOVE $9,000 AT 3RD COLLEGE (14)	

Note: The numbers appearing in parentheses correspond to the variable numbering as given in Tables 1 and 2.

Results

As explained earlier, the most important sense in which financial aid could promote choice is to increase the variety of institutions in the choice set, especially along the cost dimension so that lower income families can consider higher cost colleges. When that happens, the simple linear relationship between family income and college cost is broken. Statistically speaking, the relationship between them is randomized and the predictive power of family income disappears. The college choice set is a mediator between student background characteristics and those of the college eventually attended (Figure 1). Where the choice set is homogeneous, predicting the characteristics of the attended college is easy. Where the choice set is heterogeneous, such prediction is difficult. Consider what these results show.

For the college-bound general sample, college budgets, selectivity, and affluence in the choice set are all highly correlated ($p <$ .001) to their respective parallel characteristics in the college attended (Table 3). However, for the college-bound sample that applied for financial aid, no such systematic relationships occur (Table 4). For financial aid applicants, college budget, selectivity, and affluence levels show no significant correlation with those characteristics in the attended college. The third-choice budget correlation with the college attended budget in the financial aid sample ($p <$ .01) does not meet the pre-established criterion of significance and is not interpreted.

Notice from Tables 3 and 4 that the predictor variables in the general college sample explain some 11 percent (R squared = .11) of the variance in the attended college budget, whereas they explain only 6 percent (R squared = .06) in the financial aid sample. The

TABLE 3
Regression for Institutional Characteristics of Attended College
College-Bound Students Generally (N = 6930)

Variables:	Budget		Selectivity		Affluence	
Coefficients:	Metric	Standardized	Metric	Standardized	Metric	Standardized
Family Income	.01	.03*	.15	.11***	.94	.19***
Student's ACT	.02	.13***	.17	.33***	.18	.09***
1st-Budget	.15	.15***	.10	.03**	.19	.02
2nd-Budget	.12	.12***	−.02	−.00	.10	.01
3rd-Budget	.12	.12***	−.02	−.00	.30	.03*
1st-Mean ACT	.00	.00	.09	.09***	−.10	−.03
2nd-Mean ACT	.00	.02	.18	.17***	−.08	−.02
3rd-Mean ACT	.00	.01	.15	.14***	−.24	−.06***
1st-Affluence	−.00	−.01	.00	.01	.17	.17***
2nd-Affluence	−.00	−.03*	−.01	−.05***	.16	.16***
3rd-Affluence	−.00	−.02	−.01	−.04***	.18	.18***
R =		.11		.30		.21

* = $p <$ .05
** = $p <$ .01
*** = $p <$ .001

TABLE 4
Regression for Institutional Characteristics of Attended College
College-Bound Financial Aid Applicants (N = 254)

Variables:	Budget		Selectivity		Affluence	
Coefficients:	Metric	Standardized	Metric	Standardized	Metric	Standardized
Family Income	.00	.01	.00	.00	−.03	−.01
Student's ACT	−.00	−.02	.01	.01	.06	.04
1st-Budget	.00	.00	.12	.04	.16	.01
2nd-Budget	−.01	−.01	−.54	−.19**	−1.02	−.09
3rd-Budget	−.20	−.20**	−.02	−.01	.16	.01
1st-Mean ACT	.01	.02	−.04	−.04	−.08	−.02
2nd-Mean ACT	−.01	−.04	.15	.15	.34	.09
3rd-Mean ACT	.08	.22*	−.00	−.00	−.00	−.00
1st-Affluence	−.00	−.01	.00	.00	.01	.01
2nd-Affluence	.00	.07	−.02	−.06	−.06	−.06
3rd-Affluence	−.01	−.12	.02	.07	−.04	−.04
R =	.06		.04		.01	

* = $p < .05$
** = $p < .01$
*** = $p < .001$

general college sample shows substantially higher levels of explained variance on all three predicted college characteristics than those in the financial aid sample, and the orders of magnitude within each sample are different. In the general college sample, the largest amount of explained variance is for selectivity (30 percent), followed by affluence (21 percent), and budget (11 percent). In the financial aid sample, though, the largest amount of explained variance is for budget (6 percent), followed by selectivity (4 percent), and affluence (1 percent). The weak relationships between variables in the financial aid sample suggest a randomness or heterogeneity not seen in the general college sample.

Discussion

Family income and student-tested ability levels have been found previously to be highly positively correlated to the attended college characteristics of tuition and selectivity (Hearn, 1984; Zemsky & Oedel, 1983). The findings here in the general college-bound sample are consistent with this other research, yet surprisingly, these results do not occur here for the financial aid applicant sample. The fact that no significant relationships of this nature occur in the financial aid sample does not mean that these institutional characteristics are not important to the individuals in the sample set; rather, *in the aggregate* the variability of students' reported family incomes and the tested ability levels is widely and randomly dispersed across the range of attended colleges' budget, selectivity, and affluence levels. This is not to suggest that the college choice process is itself random for any given individual. Specifically, when compared to the general college-bound sample, the results from the financial aid applicant

sample suggest that students at all income levels are choosing institutions varying in budget, selectivity, and affluence. Similarly for the variable of tested ability, students at a variety of ability levels who are financial aid applicants are considering and attending institutions ranging greatly in budget, selectivity, and affluence. The somewhat paradoxical implication that follows is that some lower ability financial aid applicants might attend more selective colleges which would otherwise be inclined to deny them admission on the basis of ability. However, such admission is possible because even selective colleges may admit students of quite low ability if the students' personal qualities or other factors are given greater weight in the admissions decision (Willingham & Breland, 1982).

Another contrast to earlier research of importance to emphasize here is the finding of Hearn (1984) that black student enrollment tended to be associated with higher tuition and fee expense and with less selectivity. As mentioned earlier, the financial aid applicant sample in this study was drawn to somewhat overrepresent blacks and other minorities, so the absence of relationships between the dependent variables and attended college budgets in this sample is intriguing. Hearn's (1984) study did not include a financial aid variable and somewhat underrepresented non-white students, so this contrast in findings suggests the potential value for future research which studies whether the financial aid process adds heterogeneity to colleges' student populations along racial and socioeconomic lines.

For the general college-bound sample, the variables of budget, selectivity and affluence for the first, second, and third choice colleges in the choice set are all highly related to their respective characteristics in the college actually attended ($p < .001$). For the financial aid sample, three relationships between choice set characteristics and attended college characteristics begin to approach levels of significance but fail to reach the criterion level set here ($p < .001$). Because the multivariate tests do not reach the predetermined significance level set here, none of these relationships will be interpreted. It appears from this data that the choice sets of financial aid applicants are not as homogeneous as the general college sample. To the extent that financial aid broadens the range of institutional characteristics available to the student to consider, policymakers might take this data as some evidence that the policy goal of institutional choice is being realized.

One implication of these findings is that for the student who determines that financial assistance will be necessary to attend college, the range of possible colleges to consider is much wider than it would be otherwise, at least along the budget dimension. Conversely, the decision *not* to apply for financial aid to attend college may limit the range of possible alternatives, and misconceptions about college costs and the financial aid process may influence college choice sets in their formation. In a recent Gallup survey (Council for Advancement and Support of Education, 1988) 49 percent of high school juniors and seniors surveyed thought that they cannot

"The somewhat paradoxical implication is that some lower ability financial aid applicants might attend more selective colleges which would otherwise be inclined to deny them admission on the basis of ability."

get aid for an expensive college if their parents can afford a less expensive school, and 40 percent said that aid is only available to students who cannot afford college. Such misconceptions will surely influence the formation of choice sets in adverse ways.

The oft-mentioned public policy goals of student financial aid are *access* and *choice*. Clearly, there is no choice without first creating access to more than one college option. As regards choice, the question is not: Does financial aid encourage students to apply to more colleges? If the additional colleges considered are similar in characteristics to the ones previously selected, then little has been gained. Nor is the question about choice whether financial aid dollars can be used in a bidding war to attract student enrollments, an issue pertinent mostly to influencing the few, highly talented students. Nor is the issue even the question of making the private and public sectors more competitive in net costs. Rather, the important issue in promoting choice with financial aid is the degree to which students consider a greater variety of institutions to attend. To this writer's investigation (and subsequent surprise), no one in the long history of financial aid research has stated the issue of choice in these terms. The bulk of research on financial aid and college choice seems to have focused on the influence of financial aid on the earliest stage of creating access to college or on the final stage of choice in which one college is selected among others. Most researchers have overlooked that stage in the process in which college options are being searched and choice sets are being formed. As colleges struggle to achieve social and cultural diversity on their campuses, it seems clear that diversity in student college choice sets is the most meaningful starting point for diversity in student enrollments. This middle area of the college choice sequence, the "search" phase, is arguably the most critical area to any prediction of college enrollment and that area most in need of more research. ✦

"Policymakers might take this data as some evidence that the policy goal of institutional choice is being realized."

References

Aslanian, C. B. & Brickell, H. M. (1988). *How Americans in Transition Study for College Credit.* New York: College Entrance Examination Board.

Bean, A.G. and Centra, J.A. (1973). Multiple College Applications. *Journal of College Student Personnel,* 14 (6), 537-543.

Chapman, R.C. (1979). Pricing Policy and the College Choice Process. *Research in Higher Education,* 10, 37-57.

Chapman, R.C. and Jackson, R. (1987). College Choices of Academically Able Students: The Influence of No-Need Financial Aid and Other Factors. *Research Monograph No. 10.* New York: College Entrance Examination Board.

College Choice and the Student Transition Process. Iowa City, IA: Research Report of the American College Testing National Center for the Advancement of Educational Practices.

Cowart, S.C. (1988). Survey of Participation in Higher Education among Young People 13-21 Years of Age. Washington, DC: Council for Advancement and Support of Education.

Fenske, R.H., Boyd, J., and Maxey, E.J. (1979). State Financial Aid to Students: A Trend Analysis of Access and Choice of Public or Private College. *College and University,* 54, 139-155.

Fields, C., and LeMay, M. (1973). Student Financial Aid: Effects on Educational Decisions and Academic Achievement. *Journal of College Student Personnel,* 14, 425-429.

Freeman, H.B. (1984). *Impact of No-need Scholarships on the Matriculation Decisions of Academically Talented Students.* Paper presented at the Annual Meeting of the American Association of Higher Education, Chicago.

Hearn, J. (1984). The Relative Roles of Academic, Ascribed, and Socio-economic Characteristics in College Destination. *Sociology of Education,* 57, 22-30.

Hossler, D. and Gallagher, K.S. (1987). Studying Student College Choice: A Three-phase Model and the Implications for Policymakers. *College and University,* 2 (3), 207-221.

Hossler, D., Braxton J., & Coopersmith, G. (1989). Understanding Student College Choice. In Smart, J.C. (Ed.) *Higher Education: Handbook of Theory and Research.* (Vol. V.). New York: Agathon Press.

Jackson, G.A. (1978). Financial Aid and Student Enrollment. *Journal of Higher Education,* 49, 548-574.

Jackson, Gregory (1982). Public Efficiency and Private Choice in Higher Education. *Educational Evaluation and Policy Analysis,* 4 (2), 237-47.

Litten, L. H.; Sullivan, D.; Brodigan, D. L. (1983). *Applying Market Research in College Admissions. New York: College Entrance Examination Board.*

Maguire, J. and Lay, R. (1981). Modeling the College Choice Process: Images and Decisions. College and University, 56 (3), 123-139.

MacMahon, W.W. & Wagner, A.P. (1973). *A Study of the College Investment Decision.* Iowa City, IA: American College Testing Program.

Muffo, J.A. (1987). Market Segmentation in Higher Education: A Case Study. *Journal of Student Financial Aid,* 17, (3), 31-40.

Munday, L.A. (1976). *Impact of Educational Development, Family Income, College Costs, and Financial Aid in Student Choice and Enrollment in College.* Iowa City, IA: American College Testing Program.

National Center for Education Statistics. (1988). *Undergraduate Financing of Postsecondary Education. A Report of the 1987 National Postsecondary Student Aid Study.* Washington, DC: U.S. Department of Education.

Stevens, J. (1986). *Applied Multivariate Statistics for the Social Sciences.* Hillsdale, NJ: Lawrence Erlbaum.

Tierney, M. (1980). The Impact of Financial Aid on Student Demand for Public/Private Higher Education. *Journal of Higher Education,* 51, 527-545.

Webb, E.J.; Campbell, D.T.; Schwartz, R.D.; Seechrest, L. (1966). *Unobtrusive Measures: Nonreactive Research in the Social Sciences.* Chicago: Rand McNally.

Welki, A.M. and Navratil, F.J. (1987). The Role of Applicants' Perceptions in the Choice of College. *College and University,* 62 (2), 147-160.

Willingham, W., and Breland, H. (1982). *Personal Qualities and College Admissions.* New York: College Entrance Examination Board.

Zemsky, R. & Oedel, P. (1983). *The Structure of College Choice.* New York: College Entrance Examination Board.