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ABSTRACT

To provide women of the region and their counselors with information for assessing choices of college majors and career plans, the Southern Regional Education Board Manpower and Education Project findings on the employment outlook in the South for college graduates in various fields of study were refined to differentiate the total projected supply of graduates by sex. From an employment perspective, the most favorable combination of factors for women college students is a field of study with a limited percentage of graduating women now entering an occupation where women have been underrepresented in the past, and where total openings exceed total supply of graduating students of both sexes. Examples of such fields are engineering, accounting, business administration, computer sciences, public administration, hospital administration, and the medical professions. Despite high representation in the various health fields, college women will continue to find favorable job market in nursing, physical and occupational therapy, dental hygiene, medical record librarianship, medical laboratory technology, and other health fields. Although more women students are switching to fields previously dominated by men, over half of them still major in education and the arts and humanities--fields in which the job outlook is relatively poor. (Editor/JT)

College Women and the Job Market in the South, 1980

2

SOUTHERN REGIONAL EDUCATION BOARD

Highlights

From an employment perspective, the most favorable combination of factors for women college students is a field of study with a limited percentage of graduating women now entering an occupation where women have been underrepresented in the past, and where total openings exceed total supply of graduating students of both sexes.

Examples of such fields are engineering, accounting, business administration, computer sciences, public administration, hospital administration, and the medical professions.

Despite high representation in the various health fields, college women will continue to find a favorable job market in nursing, physical and occupational therapy, dental hygiene, medical record librarianship, medical laboratory technology and other health fields.

Although more women students are switching to fields previously dominated by men, over half of them still major in education and the arts and humanities — fields in which the job outlook is relatively poor.

If women do not switch to other fields of study, they may risk a greater likelihood of being unemployed in future years, or of being employed in occupations unrelated to the academic fields in which they have majored.

College Women and the Job Market In the South, 1980

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Table of Contents

Foreword

Southern Regional Education Board Manpower and Education reports have been published in several fields of study in which men predominate (engineering, law, business and management, public administration, and the social sciences) and some in which women predominate (teaching, social welfare and home economics). The present report deals with the entire range of major disciplines and occupations and evaluates the particular attractiveness of each field to women, in light of changing patterns of the role of sex differences in occupational choice.

Forty-three percent of degrees granted in the South today are earned by women, but the small percentages of women in some fields indicate there is considerable room for expansion of opportunity. Of 12,035 bachelor's degrees in engineering in 1972-73, e.g., only 1 percent were earned by women; only 6 percent of master's degrees in business and management and 5 percent of first professional degrees in law went to women. This study should be useful for helping students sharpen the information on which decisions of program major can be based and to assist in gaining a better understanding of the career implications implied by program choices already made.

Board staff will be interested in learning from guidance counselors how relevant they find this publication in responding to the career development inquiries of women students.

Winfred L. Godwin
President

Introduction

In 1975 the SREB Manpower and Education Project issued a report on the employment outlook in the South for college graduates in various fields of study.[1] The report compared the projected supply of college graduates in the region in 1980 by fields of study, with projected openings in various occupations relevant to these fields of study. The supply of college graduates was not differentiated by race or sex.

Because of current interest in employment opportunities for women and for black college graduates, the 1975 findings have been refined to differentiate the total projected supply of graduates by race and sex. This report presents the findings for women and a companion publication analyzes the outlook for black graduates of the region.

The purpose of projecting the supply of graduates by race and sex and of comparing them to occupational openings is not to develop a set of "quotas" of the total projected openings that might be assigned to either women or black graduates in the region in 1980. Rather, the objective of this report, and of the companion publication for black students, is to provide women and black students of the region, and their counselors, with information for assessing choices of college majors and career plans.

This report focuses on education from the perspective of vocational orientation, or in terms of career enhancement.* Fields of study, and the concentration of women in various areas, are reviewed according to an assessment of employment opportunities. This perspective necessarily disregards other important reasons for a college education and choices of major, such as personal enrichment and the pursuit of knowledge for its own sake. To the extent that students, male and female, do pursue a college degree and decide on certain majors because they are interested in "educating themselves," regardless of what the labor market holds in store, the assessments of this report are of limited interest.

The findings of this report do not imply that women should overlook the purposes of education which are not related to employment and careers. Certainly personal intellectual enrichment has been, and will continue to be, an important motivation for the pursuit of college studies and for choices of major fields of study. Each student, male and female, in the final analysis makes his own determination as to how

*The valuable suggestions made by Betty M. Vetter, Executive Director, the Scientific Manpower Commission, who read a draft of this report, are gratefully acknowledged. The author, however, bears full responsibility for the opinions expressed.

important the "job prospects" are in the process of weighing the pros and cons of college attendance, and choice among various fields of study. Each student is free either to use or to consider irrelevant the information on job prospects in deciding the choice of college majors.

Three interacting dimensions affecting the employment outlook for women college graduates in each field of study are considered here. One is the proportion of women already employed in any occupation to which female college graduates aspire. Another is the proportion that women constitute of college graduates in each field of study. A third variable is the general labor market outlook for each field of study in terms of the total supply of college graduates, of both sexes, relative to the total number of job openings requiring that particular educational preparation.

An occupation which employs a low proportion of women is more likely to be affected by the influence of equal opportunity or affirmative action programs than is one where women are already well represented. For example, female college graduates are likely to encounter a favorable climate if seeking employment as engineers, since in 1970 only 2 percent of all engineers were women. Females seeking employment as dietitians, on the other hand, are entering a field where in 1970 women constituted 92 percent of total employment.

A field of study that produces mostly female graduates is likely to be associated with an occupation which has traditionally been staffed mostly by women. Nursing is a prime example of such a field in which the preponderance of graduates continues to be women entering a profession in which women have constituted over 95 percent of total employment.

There are fields where women recently have made up a substantial share of graduates, or where it is expected their representation among those graduating will increase, but where the employment in the related occupation is still mostly male because of previous educational patterns. Law is an example, with a rapidly expanding percentage of female students (19 percent of total U.S. law school enrollment in 1974 versus 4 percent in 1960), and yet low female representation (5 percent) of total employment as lawyers in 1970.[2] This low representation of females in the occupation is favorable to employment of women from the affirmative action perspective, but is constrained to the extent that there are more lawyers of *both* sexes graduating annually than openings to accommodate them.

The most favorable combination of factors for female graduates is a field of study with a limited percentage of women entering an occupation but where women have been underrepresented in the past, and where total openings exceed total supply of graduating students of both sexes. An example of this situation is in computer sciences. In 1973, in the United States, only 15 percent of all bachelor's in computer

sciences were granted to women (18 percent in the region), and only 20 percent of all persons employed as computer specialists in 1970 were women. Additionally, computer sciences is one of the fields expected to be producing fewer total graduates of both sexes by 1980 than the job openings projected for the same period.

The approach followed in this report to assess employment opportunities for women includes consideration of two variables: the proportion of female graduates in each field of study, and the overall employment outlook in the field of study, regardless of sex. The third variable — the representation of females already employed in the occupations relevant to each field of study — is closely dependent on the percentage of women graduating in each field of study. It is considered only where there appears to be a great divergence between future degree production by women in the field and cumulative representation of women employed in occupations related to that field.

The findings of this report are related to those discussed in the SREB report *Supply and Demand for College Graduates in the South in 1980*. Although some of the terms used in that report are again defined in this one, readers who wish more detail about the underlying methodology of the projections of supply and demand are referred to the prior publication.

Terms and Methods

Projection of Supply of Female Graduates

Projections of 1980 female graduates in the region, by fields of study, were prepared on the basis of the historical trends of female representation in the United States in each field of study, by degree levels. Female representation by fields of study in the South for 1972-73 was then compared to the U.S. trend.

The overall share of female degrees in the region in 1980 is not expected to show much change from 1973, when the percentages of female degrees were 44.6 percent for bachelor's degrees, 45.7 percent for master's degrees and 18.8 percent for doctorates. Only for the first professional level is a rather marked increase projected in the degree share for women — from 5 percent in 1973 to 15 percent in 1980 (in the region).

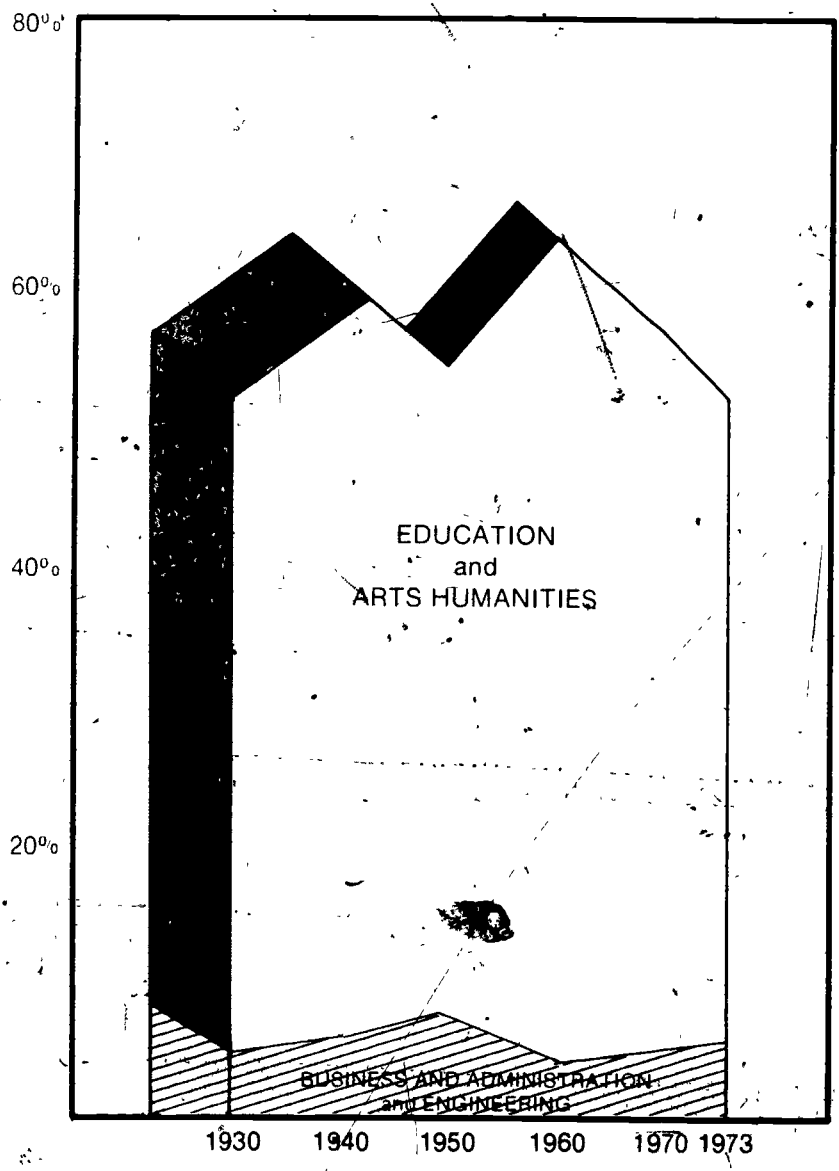
The distribution of women among various fields of study will change as women become more involved in fields where they have previously not been well represented. For example, the proportion of total engineering bachelor's degrees in the region to be granted to women is projected to rise to 4 or 5 percent in 1980 from the 1.2 percent share in 1973. The female proportion of bachelor's degrees in education[3] is projected to drop in 1980 to 72 percent — or down slightly from the 74 percent share of the regional total in 1973.

Excepting for marked changes in female shares of certain first professional degrees, however, no major shifts in female choices of studies are expected by 1980. This rather conservative assessment of how fast women will move into fields which few have chosen in the past is based on a review of the longrun distribution of women in various college majors. Adkins recently documented longrun trends in the structure of college degrees through 1970, and finds no "important lessening of inequality of the sexes" in terms of what men and women have chosen to study.[4]

His findings on the proportion of total female bachelor's degrees represented by major divisions of study from 1930 to 1970 are illustrated in Figure 1. (Details are shown in Appendix 1.) Degree statistics for 1972-73 were added by the SREB Manpower and Education project on the basis of comparable classifications of study. As shown in Figure 1, women have tended to concentrate in education and arts and humanities. In 1930, 55.9 percent of all female bachelor's degrees were in these two areas. The proportion rose to 65.2 percent in 1960, but declined back to 55 percent in 1973, almost exactly what it was in 1930.

Figure 1

Distribution of Female Bachelor's Degrees
in Selected Fields, U. S., 1930-1973



Note See Appendix 1 for detail on fields of study included and sources

The proportion of all female bachelor's degrees granted in the two areas of business and administration and engineering combined reached 7.4 percent in 1950. The 1973 share of 4.9 percent, however, is almost exactly the same as it was in 1930. Despite the marked increases during the last two years in female enrollment in these fields, the 1980 proportion of women with bachelor's degrees in engineering and business administration is not expected to exceed 7 percent of total bachelor's degrees to be earned by women in the region.

Market-Ready Supply of Female College Graduates

This differentiates the supply of total female degrees in any one year, at all levels, from the supply of female graduates in that year who are actually new entrants into the labor market. It adjusts for a small proportion of female bachelor's (3 percent) who do not enter the labor market at all, for bachelor's degree recipients who continue as full-time students and thus are not available to work, and for graduate students who were already employed full-time in their own fields while earning advanced degrees, so that they do not constitute *new* entrants into the college level job market.

Total and female market-ready degree projections for the region in 1980, at the combined bachelor's, master's and doctorate levels, for the major fields of study, are shown in Appendix 2.

Education Field of Study

The education field of study classification in this report has been adjusted to include the number of graduates estimated to have earned teaching certificates in conjunction with other academic fields of study. Each academic field of study that contributes graduates with teaching certificates has been adjusted downward by the corresponding estimated percentage of teaching certificates.

Openings for College Graduates

The openings projected for each occupation show the total estimated openings for college graduates in 1980, for both men and women. These openings were projected on the basis of two data sources: the Departments of Employment Security in each state and the National Planning Association employment estimates by states for 1980. The openings projected for college graduates represent the proportion of openings in each occupation estimated to be filled by college graduates on the basis of past trends of college representation in each occupation.

Female Representation Index

The regional projected 1980 market-ready supply of degrees for women for all fields, and at all degree levels, constitutes 43 percent of all degrees. The corresponding percentage of market-ready degrees for women in each field of study was divided by this average 43 percent representation to yield an index of either over- or underrepresentation. For example, market-ready degrees for women in education constitute 69 percent of the total at all degree levels, and produce an index of 160 when compared to the average 43 percent representation. Women are said, therefore, to be overrepresented in education. Conversely, women are projected to constitute only 5 percent of all market-ready engineering degrees in the region in 1980, which, compared to their average representation of 43 percent, yields a representation index of 12 in engineering. An index above 100 indicates overrepresentation of females, and one below 100 shows underrepresentation. Indices of representation were constructed for each of the major fields of study classifications, for a selected group of subfields (e.g., hospital administration under the major field of the health professions), and for the professions requiring a first professional degree. Bachelor's, master's and doctoral degrees projected for women and translated into market-ready supply are combined to yield the major field and selected subfield indices.

Table 1

Index of Projected Over- and Underrepresentation of Women in 1980, Market-Ready Degrees by Major Fields of Study

Overrepresented		Underrepresented	
Foreign Languages	212	Communications	91
Library Science	202	Social Sciences and Area Studies	86
Health Professions	179	Biological Sciences	79
Education	160	Computer Sciences	42
Fine Arts	153	Accounting	40
Public Affairs	121	Business Administration, Except Accounting	33
Psychology	114	Physical Science	33
Mathematics & Statistics	107	Architecture*	26
		Agriculture and Natural Resources	14
		Engineering	12

*Excluding Planning

The indices of representation are shown in Table 1 for the major fields, and in Table 2 for subfields and first professional degrees. The fields are listed in the order of their indices, with the fields where women are more overrepresented listed first.

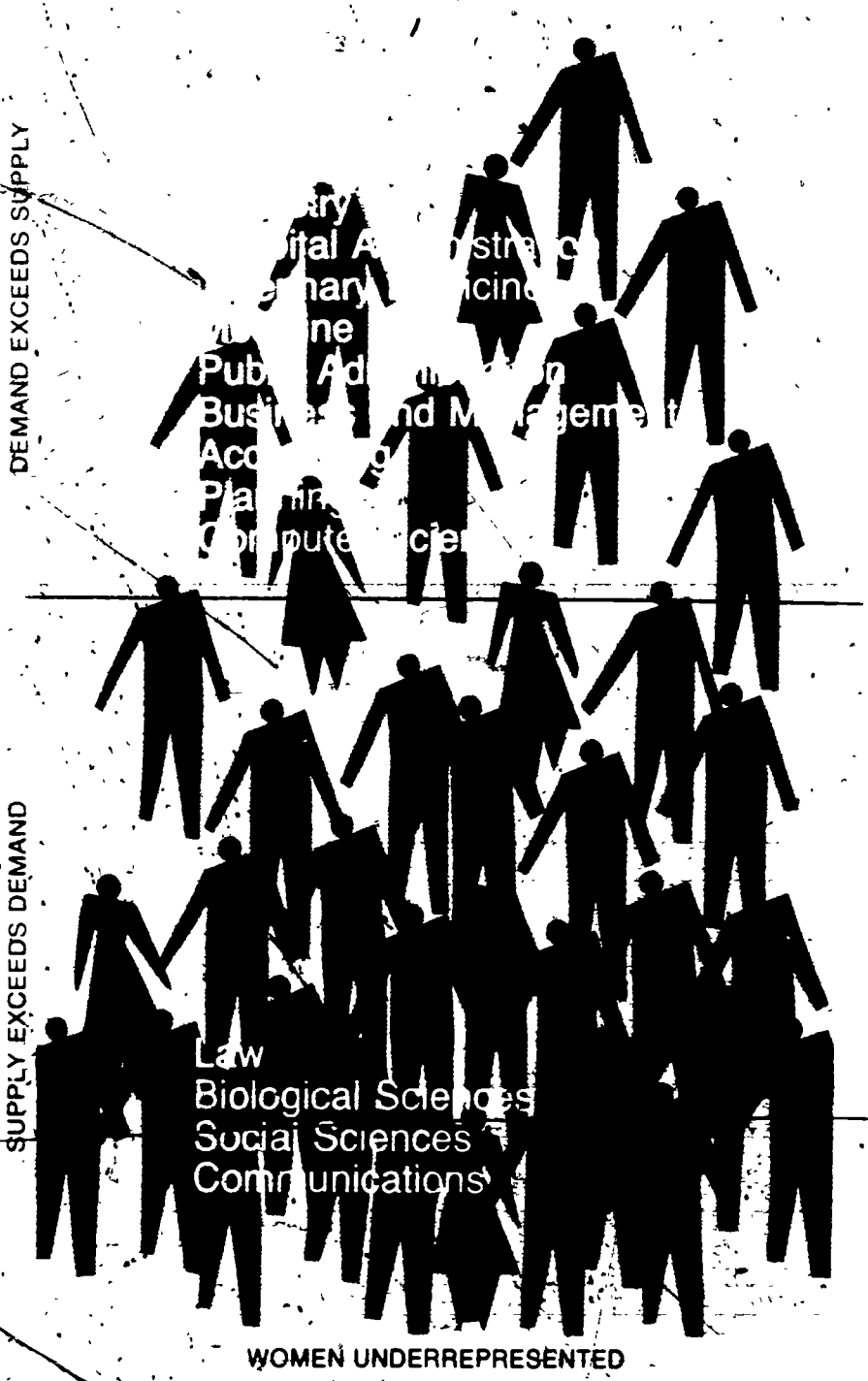
Table 2

Index of Projected Over- and Underrepresentation of Women in 1980, Market-Ready Degrees, By Selected Subfields of Study and Professions

Overrepresented		Underrepresented	
Dental Hygiene	228	Law	47
Home Economics	226	Planning	37
Nursing	223	Medicine	35
Medical Records Librarianship	214	Veterinary Medicine	23
Occupational Therapy	214	Hospital Administration	19
Medical Lab Technology	188	Optometry	19
Physical Therapy	186	Dentistry	9
Social Work	158		

Figure 2.

SUPPLY AND DEMAND BALANCES and REPRESENTATION OF



WOMEN FOR SELECTED FIELDS OF STUDY

Opportunities for Women

Four Patterns of Occupation Outlook

The Best of Both Worlds: Underrepresentation and Favorable Market Outlook

Women graduates will find favorable opportunities especially in fields where the total projected openings exceed projected market-ready supply of graduates of both sexes, and where women are underrepresented in the field of study. In such a situation, women will benefit in two ways: a) from a general deficit of graduates in the field, and b) from affirmative action programs to increase female representation in occupations related to that field of study. The combined effect of the general employment outlook and of the degree of female representation for various fields of study is illustrated in Figure 2

The fields and subfields of study in which women are both underrepresented and for which the general employment outlook is favorable are listed below, in the order of the greatest underrepresentation of women:

Engineering
Dentistry
Hospital Administration
Veterinary Medicine
Medicine
Public Administration
Business Administration, other than Accounting
Planning
Accounting
Computer Sciences

Women are also underrepresented in optometry and in the physical sciences. These fields are not included in the preceding list because the labor market for all graduates, regardless of sex, is less clear and less certain of being favorable than is true of the fields listed. The projected supply and demand in optometry, according to the SREB Manpower and Education project's regional analysis, appear to be in fairly good balance. Although specifically identified projected occupational openings for physical science graduates are fewer than the expected number of graduates, the fluidity of physical science majors for moving into engineering jobs, and the possible expansion of engineering and scientific employment as a result of energy short-

ages, could mean that physical science will be a favorable field in the coming years

Engineering is an area in which women will find a very favorable outlook Their very low representation in engineering jobs, and the minor percentage of engineering graduates mean a particularly fertile atmosphere for affirmative action There has been much emphasis about job opportunities for women in engineering, and women are gradually responding to this challenge. In 1974 they constituted 5.7 percent of total enrollment in the U S. in engineering programs. This is an improvement over their 1 percent representation in 1960, but is still only a very small percentage of the emerging supply of new engineers [5] First year enrollment in 1975 for the U S., however, indicated a marked increase, with more than 10% of the freshman class being women.

Business administration and accounting have been identified as favorable fields for employment of college graduates in prior SREB Manpower and Education reports. Indeed, the supply of market-ready graduates in business and management for the next several years is projected to be approximately half of the number of openings identified in a great variety of administrative and managerial occupations In 1973 women constituted 15 percent of all bachelor's degrees in accounting in the South This is the highest proportion of women in any of the business and management specialties, except secretarial studies In areas such as banking and finance and insurance, women had much smaller representation. Women constituted only 6 percent of all Masters of Business Administration (MBA) granted in the region in 1973 Yet this degree often serves as the entry point into management careers in business and government, and has enjoyed a relatively strong market even during the recent recession. Although enrollment of women in business and management has risen in recent years, including in the MBA programs, further switching by female students from other majors to business and management and related career plans would not overcrowd the field.

Women are underrepresented in all the major medical professions (medicine, dentistry and veterinary medicine). Although there has been an increase during recent years of women enrolled in these fields, both nationally and in the region, the percentage of women in these professions is still quite low (in 1974, 15% of total enrollment in the three fields). Applicants of both sexes to professional schools vastly exceed the number of slots these schools can accommodate; however the continued emphasis on increased female participation in the professions means that qualified female applicants will face a favorable climate. It is estimated that if women achieved the same representation in the professional schools which they now have in the region for all college degrees — 43 percent — approximately 1,000-1,500 more would be enrolled in these professional fields than at

present Although in terms of total female college students in the region this is not a huge reservoir of opportunities, it does offer encouragement to qualified and ambitious female students to set their sights on these professions where the employment outlook is good

Hospital and health care administration is another health field in which opportunities appear favorable The expansion of hospitals and nursing homes, the emphasis on raising standards in the administration of these institutions, and the stress on coordination and planning of health delivery systems will produce continuing demand for persons specifically trained to manage and administer health facilities Although in prior years the management of such institutions often fell to persons with general business and management training or experience, the trend in the future will be for more specific training that includes an orientation toward health care systems Women, with their traditionally strong participation in many health fields, should find the hospital and health care administration field to be very favorable.

Opportunities in the field of public administration were described in an earlier SREB Manpower and Education publication which emphasized that the route to administrative positions in government is often through prior employment at operational levels Women, as well as men, who aspire to public administration positions are more likely to be appointed to such spots by promotion from within government rather than directly upon graduating from college with public administration degrees. Their chances for such promotion are enhanced if they obtain a public administration degree at the master's level, a route that is often followed by government employees studying part-time while holding full-time governmental jobs.

City, community and regional planning is a field of study with a favorable outlook in terms of projected graduates and occupational openings. It is estimated that women will constitute less than 20 percent of the projected graduates in the region in this field.

Overrepresentation with a Favorable Outlook

The employment outlook is favorable in a number of fields in which women are overrepresented. In these fields opportunities are promising because of the projected undersupply of market-ready degrees relative to projected openings, although the added influence of affirmative action programs is missing, since women already constitute the bulk of present employment in the relevant occupations.

The fields and subfields with overrepresentation of females and favorable employment outlook are listed below in the order of the greatest overrepresentation of women:

Dental Hygiene
Nursing

Medical Record Librarianship
Occupational Therapy
Library Science
Medical Laboratory Technology
Physical Therapy
Social Work

Most of the fields in which women are overrepresented, and which also appear favorable, are in the allied health careers. The projections for employment opportunities in occupations such as nurse, dental hygienist, medical record librarian and medical laboratory technologist include only the openings in each occupation estimated to be filled by college graduates. In most of these occupations, there are also many additional openings which will be filled by persons with two-year degrees in the appropriate specialties. Two-year degree programs have been producing a rapidly growing supply of graduates who each year constitute a large component of job applicants competing with the four-year program graduates. If the growing pool of two-year program graduates can fulfill the job requirements and effectively compete with the four-year program graduates, the favorable outlook projections in the allied health fields for college graduates may have to be revised. Unfortunately, to date no comprehensive regional analysis has been completed which compares the combined supply of graduates at the two- and four-year levels against total openings.

Forecasts of openings in the health field depend a great deal upon future national policies on funding of health and sick care. If new federal programs are enacted to finance health care on a more comprehensive basis than is now available, the demand for health manpower in all occupations will exceed the present projections, and will further strengthen the generally favorable outlook for women graduates in the various health specialties.

Social work is included among the fields which appear favorable for future women college graduates. The projections of openings in all industries depend to a large extent on the employment trends for these industries during past years. The human services industry showed remarkable growth during the 1960's and early 1970's, so that extension of previous trends into the late 1970's would signal a corresponding expansion of positions in social work. The forecast of a favorable outlook for social work graduates implies a continuation of governmental policy to fund social services. To the extent, however, that budgetary constraints produced by the 1974-75 recession at all levels of government have slowed expansion of human service programs, the outlook for social workers may not be as promising as was previously assumed. At the present time the employment situation for social work graduates appears good in rural areas, but much less

favorable in the metropolitan areas which many college graduates prefer. Opportunities for employment of social workers will continue to be better in smaller and more remote communities than in large cities, to which graduates have flocked

Library science is another field in which employment projections signal a favorable market despite the present situation in which library science graduates report difficulty in locating jobs, especially in urban centers The dependence of this occupation on governmental funding puts it in the same category of uncertainty described above for social work graduates.

Home economics is a field with heavy overrepresentation of women. The job outlook in home economics varies considerably by specialty within the field. For example, home economics graduates with training specific to the management of hotels and restaurants will have more opportunities than those prepared to teach home economics in secondary schools. Likewise, those with a background in early childhood development will face a better job market than women prepared in home management and equipment

Underrepresentation, Poor Outlook

Fields in which women are underrepresented, but in which the overall employment outlook is unfavorable for both sexes are listed below, with the most underrepresented fields listed last:

Communications
Social Sciences and Area Studies
Biological Sciences
Law

Women are only slightly underrepresented in communications. They are estimated to constitute 39 percent of the projected market-ready supply of graduates in communications in 1980, only slightly below their 43 percent average share for all fields of study. Women constitute a higher percentage of graduates in the general journalism category than they do in the radio/television and advertising specialties. Communications is one of the fields in which projected degrees far exceed the projected openings.

Women are also only slightly underrepresented in the social sciences as a whole, although their ratio is considerably lower in some specialties like economics and criminology than in others (sociology and history). In an earlier SREB Manpower and Education report on the employment outlook for social science majors, nine major occupations were examined to assess projected annual openings in the region for these majors. Each occupation included — such as economist or social scientist — covers numerous subclassifications

as, for example, agricultural economist and investment analyst, or crime specialist and demographer. For all these occupations the annual openings constitute only 10 percent of the projected market-ready social science graduates with relevant degrees Although social science graduates have traditionally used their broad-based education by working in business and industry, and no doubt will continue to do so, the general outlook is poor. Ironically, the one social science specialty in which the outlook is better — economics — is also the one in which female representation is quite low

In the biological sciences the number of openings in occupations clearly labeled as biologists will not suffice to accommodate the projected supply of graduates Biology majors traditionally have gone into laboratory technician and other health related occupations also. It is doubtful, however, that openings will be sufficient to bring into balance what appears to be an oversupply of biology majors.

The increasing number of female law students is a recent phenomenon In 1960 they constituted only 4 percent of total U.S. law school enrollment, while in 1974 their share had risen to 19 percent. Their share of 1974 first-year enrollment was even higher (23 percent). This increasing proportion of female law *students* however is producing a very slow change in the proportion of female *lawyers*, which in 1974 still stood at only 7 percent

Although women are still underrepresented in law, the field is not promising because of the projected oversupply of graduating lawyers of both sexes The projected annual supply of new lawyers by 1980 for the region is 7,800, considerably above the projected annual demand for lawyers (4,900-5,100, according to two data sources).

Two professional fields in which women are underrepresented and in which the employment outlook is uncertain are pharmacy and architecture Both fields show some oversupply of graduates relative to openings in the regional projections, although the oversupply is much less severe than in communications, social sciences, biological sciences and law.

Agriculture and natural resources is another field in which women are underrepresented, but one for which it is difficult to assess the overall employment outlook. Although projected openings for occupations specifically labeled as relevant to agriculture majors (farm management advisors, foresters, agricultural scientists, etc.) do not suffice to provide employment for prospective graduates, other unidentified openings in farming and in agribusiness may produce a relatively balanced situation.

Overrepresentation and a Poor Labor Market Outlook

The worst possible situation for female college graduates from the

perspective of this report is to major in a field in which women are overrepresented and for which the employment outlook is poor. However, a large proportion of women college graduates will fall into this category Education, fine arts, foreign languages, psychology, and letters together will account for almost three-fifths of all women graduates at all degree levels in the region in 1980 These are all fields in which women predominate and for which employment prospects are highly competitive

The projected market-ready graduates in education, as defined in this report, include those in other disciplines who obtain teaching certificates The declining primary and secondary school age population for the rest of this decade and into the early 1980's produces fewer annual openings for teachers than were available in the 1960's, although the number of college graduates prepared to teach is just leveling off Women are estimated to represent 69 percent of all education graduates in 1980 in the region, a much higher proportion than their 43 percent share in all fields of study.

Languages and letters are liberal arts majors in which women have traditionally been overrepresented There has been much discussion during the past year about the employment plight of liberal arts graduates The usual prescription is that while the liberal arts afford a broad base for advancement throughout the world of work, chances of entry into the labor market are enhanced when liberal arts majors also possess saleable skills A combination of liberal arts with courses in accounting, computer sciences, statistics or personnel administration improves employment opportunities.

Mathematics presents a contradiction. Although women are overrepresented in the field, they are underrepresented in other fields in which mathematics are applied, such as engineering, accounting, banking and finance, computer sciences and economics. Since the employment outlook for graduates in non-applied mathematics is limited, women with an interest in mathematics would do well to shift their talents toward the applied areas, where the employment outlook is favorable

In past years many women majoring in mathematics used their training by teaching math in primary and secondary schools. Declining enrollments have sharply narrowed this employment opportunity. Projected 1980 market-ready graduates in mathematics of both sexes in the region (exclusive of those with teaching certificates) seriously outnumber the projected openings for mathematicians, statisticians, actuaries and mathematical technicians. This imbalance reinforces the counsel that women with an interest in mathematics direct their skills toward vocational areas where math is applied.

Women are projected to represent 49 percent of the market-ready supply of psychology graduates at all degree levels in the region in

1980, producing an overrepresentation index of 114. Psychology is another field in which it is difficult to isolate all relevant employment opportunities for the purpose of comparing openings to graduates. Occupations specifically labeled as psychologists, counselors, and other relevant occupations produce less than one half as many annual openings in the region as projected market-ready degrees. However, psychology majors may also find suitable employment in business and in human service programs, so that it is difficult to determine their total employment outlook.

Returning Workers — Extra Competition

Returning workers, or persons who obtained a college degree in prior years, retired from the labor force, and eventually reenter to compete for jobs with current college graduates, have not been included in evaluating supply and demand balances in this report. A large proportion of returning workers tends to be female, since women often leave the labor force to raise families, and reenter at a later time. Fields of study, professions and occupations in which women predominate are, therefore, also particularly prone to the competition of women returnees.

In a field in which women are overrepresented, but in which the general employment outlook is strong, returning workers do not pose a problem for new graduates. The shortage of nurses in the 1960's and early 1970's would have been even more severe if newly graduating nurses had not been augmented by returning nurses who reentered the labor force and were a welcome addition to scarce health manpower. The situation is different, however, in an overcrowded labor market such as the teaching field, where returning teachers augment a supply of newly available graduates who already experience difficulties in finding employment. The factor of returning workers adds an additional note of uncertainty to the employment prospects in many fields in which women are overrepresented.

Summary and Conclusions

As was noted earlier in this report, job opportunities and career plans constitute only one of the motivations for college studies and choice of majors. The concentration of women in the arts and humanities in past years may mean that many women consider personal enrichment and assimilation of the cultural heritage more important factors than vocational opportunities in choosing their majors. The emphasis, in this report, on career plans is certainly not to be interpreted as negating such commendable motivations in choosing among fields of study. Rather, the purpose is to provide information on career opportunities to those female students who do rate this factor high in choosing their courses of study.

The findings of this report on the opportunities for women college graduates in various fields of study are summarized in Figure 2. The fields most promising according to the criteria of this report are those where the total supply of college graduates of both sexes does not appear to meet total projected occupational openings, and in which women are underrepresented. At the other end of the spectrum, the fields with the least opportunities are those where total graduates are projected to exceed demand, and where women also tend to be overrepresented relative to their average representation in all fields of study.

Although the aggregate data do not reveal any material shifts by women in fields of study choices, detailed data for specific fields noted earlier do show some marked changes. Recent first-year enrollments of women in certain professions (law and medicine, in particular) and in engineering have shown notable gains. Many of the fields of study where employment opportunities are brightest are in the fields in which women still constitute small proportions, with engineering and business administration as prime examples. What keeps women out of these areas? A review of "Women in Engineering," concluded that the "male image" of engineering is the deterring factor. "...girls from an early age are discouraged from seeing themselves as engineers. The tragedy of this early conditioning is that it is very difficult to overcome later."[6] One of the difficulties in switching to such fields as engineering, business administration, economics or computer sciences during the college years is that most of them require a fairly strong orientation to mathematics. A disinclination of many girls to take mathematics and science courses during their high school years or early in college narrows their options in college majors, or presents them with a catch-up problem which a larger proportion of male

students may not experience. Those women who do major in math need to consider applied fields, such as computer science or accounting, where their mathematical interests and abilities are more likely to encounter favorable employment opportunities than exist for pure mathematics majors

The findings of this and earlier SREB Manpower and Education reports on the supply and demand balances for various fields of study suggest that if women do not switch to those fields in which they have been underrepresented, and for which the employment outlook is favorable, female college graduates of the future will be more likely to be unemployed than their male counterparts The other possibility is that women graduates will be more likely to be employed in jobs unrelated to their majors than is true of male graduates. If the relatedness of college majors improves progression opportunities on the job, women will be at a disadvantage relative to men because of the likelihood that they study subjects for which there are insufficient directly related job opportunities

According to a 1972 U.S. Department of Labor survey, the unemployment rate of recent female college graduates (11%) exceeded the rate for recent male graduates (8.2%). The 1974 recession has been harder on women in terms of their overall unemployment rates than has been true for men, and on young women college graduates than on men.[7]

A reversal of trends in the education sector, should birth rates rise again, or should pupil-teacher ratios be lowered, would improve the outlook for the field in which the highest proportion of women still tend to major — education. Increased governmental funding of human service programs, health care and certain governmental services would also improve the outlook for graduates in social work and other public affairs majors, psychology, health fields, and library sciences. These are all fields in which women are overrepresented.

The absence of any strong reversal in the education sector and the uncertainty over government programs and funding suggest that if more women wish to secure their future employment outlook, they need to consider fields of study which, to a large extent, they have shunned in the past.

Notes

1 *The Supply and Demand for College Graduates in the South, 1980*, Southern Regional Education Board, Atlanta, 1975 Related reports describing the market for specific fields of study, and to which the current report will make reference, are listed on page 26.

2 John B. Parrish, "Women in Professional Training — An Update," *Monthly Labor Review*, November, 1975, p. 50; and U.S Census, 1970, *Occupational Characteristics*, PC (2)-7A, Table 1.

3. "Education" in this instance refers to the degrees included in the 800 HEGIS classification system.

4. Douglas L Adkins, *The Great American Degree Machine*, The Carnegie Commission on Higher Education, Berkeley, California, 1975, p 158

5 John B. Parrish, *op. cit.*, p. 50.

6 Engineering Manpower Commission, "Women in Engineering," *Manpower Bulletin* No. 21, May, 1972, p. 5.

7 U.S Department of Labor, *Employment and Unemployment in 1974*, Special Labor Force Report, No. 178, 1975, p. 6; and *Students, Graduates and Dropouts in the Labor Market, October 1974*, Special Labor Force Report No. 180, 1975, p. 34. Women graduates who did locate jobs in 1972, however, were slightly more likely to be employed in work directly related to their fields of study than men. U.S. Department of Labor, *Employment of Recent College Graduates, October 1972*, Special Force Report No. 169, 1974, p. 36.

Appendix 1

Proportion of Female Bachelor's Degrees In Selected Fields of Study, U.S., 1930-1972-73

	1930	1940	1950	1960	1970	1973
Education	23 8%	33.9%	30 3%	46 9%	36 3%	35 2%
Arts & Humanities	32 1	26.9	23.9	18.3	22.6	19.8
Total	55.9	60 8	54.2	65.2	58.9	55.0
Business & Administration	4 1	5 0	6 6	3.0	2.9	3.9
Engineering	.5	.6	.8	.4	.6	1.0
Total	4.6	5.6	7.4	3.4	3.5	4.9

Note. The fields of study included in the above classification include the following HEGIS categories:

Education	All 800, except 822, 899 and 827
Arts & Humanities	Fine and Applied Arts 1000 Languages 1100 Letters 1500 Theology 2300
Business & Administration	Business and Management 500 Agricultural Management 110 Agricultural Business 112 Educational Administration 827 Industrial and Management Engineering 913 Hospital Administration 1202 Medical Records Librarian 1215 Institutional Management 1307 Military Science 1800 Public Administration 2102 Parks and Recreation Management 2103
Engineering	Architecture 200, except 206 Computer Sciences 700 Engineering 900, except 913

Source: Douglas L. Adkins, *The Great American Degree Machine*, The Carnegie Commission on Higher Education, Berkeley, California, 1975, p. 79-87, and U.S. Office of Education, *Earned Degrees Conferred*, 1972-73.

Appendix 2

Market-Ready Supply by Fields of Study, All Degree Levels*
Southern Region, 1980

	All Students	Women Students
Accounting	6,700	1,100
Agriculture & Natural Resources	4,700	300
Architecture & Design	1,400	200
Biological Sciences	8,700	2,900
Business & Management (excluding Accounting)	34,100	4,700
Communications	4,200	1,600
Computer and Information Sciences	1,100	200
Education	67,600	45,700
Engineering	11,800	500
Fine and Applied Arts	6,800	4,500
Foreign Languages	2,800	2,500
Health Professions	11,300	8,700
Letters	12,100	7,700
Library Sciences	1,500	1,300
Mathematics and Statistics	6,000	2,800
Physical Sciences	4,500	600
Psychology	11,500	5,700
Public Affairs	6,500	3,400
Social Science and Area Studies	30,000	11,100
Other	9,500	4,100
Total	242,700	109,600

*Except first professional degrees

Related Manpower and Education Project Reports

Richard A. Engels and Eva C. Galambos,	*Supply and Demand for College Graduates in the South, 1980*, 1975 ($2.00)
	Supply and Demand Balances of Selected College-Level Fields Projected for the SREB States, 1975 ($2.00)
Ellen Winston	*Social Welfare Education and Careers in the South*, 1975, ($2.50)
A. Kenneth Pye	*Meeting the Needs for Legal Education in the South*, 1975, ($1.00)
Eva C. Galambos	*Public Administration Programs and Careers in the South*, 1975 ($1.00)
	The Employment Outlook for Social Science Majors in the South, 1976 ($2.00)
	The Employment Outlook for Business and Management Graduates in the South, 1975 ($1.00)