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CAREER PATTERNS OF, AND OPPORTUNITIES FOR WOMEN IN SCIENCE AND ENGINEERING: PERCEPTIONS OF WOMEN PREPARING TO ENTER THE LABOR MARKET

A Thesis

Presented for the

Master of Science

Degree

The University of Tennessee, Knoxville

Cynthia K. Shinabarger

June 1987

DEDICATION

To my parents, David and Lucy Shinabarger, in recognition of their support.

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ABSTRACT

It has been suggested that research needs to be done in the area of beliefs of college females about science and engineering careers. However, studies have not been conducted in this area. Thus, the present study begins to address this subject by investigating the perceptions of women preparing to graduate with undergraduate degrees in science and engineering about the current status of salaries and other labor market indicators for women in these fields. Eighty-five women preparing to graduate with degrees in science and engineering responded to a questionnaire concerning their beliefs about salaries, career patterns, and labor market indicators for women in science and engineering professions. Data from the National Science Foundation was used to form the items for the questionnaire. The results indicated that women preparing to receive their undergraduate degrees in science and engineering have an inaccurate perception of what the labor market is actually like. In general, women tend to over-estimate their opportunities. It is recommended that women be educated concerning their opportunities in the science and engineering labor market (during their undergraduate training).

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CHAPTER I

INTRODUCTION

Introduction to Problem

Throughout the history of this country the nation's ability to compete effectively in world markets has depended on the science and technology base. In the 1980's several national study groups have addressed human resource needs in science and technology (National Research Council, 1980; Nation Science Foundation, 1986). The Office of Technology Assessment of the United States Congress (OTA) currently has several studies in progress that will analyze various aspects of preparing scientists and engineers (Science, Education, and Transportation Program, 1987). Integral to the OTA study are questions related to gender.

Before the 1820's, most women were not receiving secondary, much less higher, education. This was a major stumbling block to their equality. It was hoped that once women were educated, they would be accepted as men's intellectual equals. However, the prevailing belief was that the purpose of educating women was to make them better mothers, not to have them make contributions to science.

Men were able to keep women out of many positions in science and engineering by requiring doctoral degrees for these positions. It is difficult to obtain a doctoral degree if one is not permitted to attend graduate school. A

successful and prominent strategist, Christine Ladd-Franklin, worked for 50 years for the education of women. Largely because of her work, graduate schools were open to women in the 1890's, thus giving women the opportunity to earn the same doctorates as men.

Even these coveted degrees did not fully open careers in science and engineering to women. Women, for the most part, were obtaining positions for what was termed "women's work." If jobs were segregated either territorially (working on "feminine" subject matters such as child psychology or home economics) or hierarchically (for example, assisting men in tedious, anonymous, and low paying tasks in scientific institutions like observatories, museums, and laboratories) they could be considered appropriate for women. Even when more women were earning doctorates and gaining employment in science and engineering, (in the late 1800's and early 1900's) they still faced a barrier, that of "professionalism." Many men were afraid that the presence of women in science would lower their prestige. Women faced many restrictions when entering professional societies. For example, they were limited to lower-level memberships; were required to meet higher qualifications; and were restricted to only the most formal and public of the group's activities.

Before 1940, women scientists in industry were very few. Rather than campaigning to challenge or change the

major patterns of women's employment, they tried to educate other women about the prevailing attitudes and advise them on how to adapt to them. Now, however, women are advocating challenge and change in place of adaptation. Women may have "come a long way," but there is still room for change. There are still differences between the opportunities available to women and men in science and engineering. Also, they certainly have not reached equality in pay. However, many women are receiving a message which says that they are beginning to be accepted in all areas of society and the workforce; equal pay for equal work is now a reality; and there is no longer a need for legislation to protect women or to ensure that in the eyes of the law, as guaranteed by the Constitution, women are equal. Women believing this message do not have an adequate perception of reality.

Problem Statement

According to McLure and Piel (1978), Hollinger (1985), and Hawley (1972), research needs to be done in the area of beliefs of college females about science and engineering careers. However, studies have not been done in this area. Thus, the present study begins to address this topic by investigating the perceptions of women preparing to graduate with undergraduate degrees in science and engineering about

the current status of salaries and other labor market indicators for women in these fields.

Hypotheses

Among senior women at the University of Tennessee at Knoxville with majors in physical science, life science, psychology, and engineering, it is hypothesized that there will be no significant difference between field of study and beliefs about salaries for women in science and engineering fields. Secondly, it is hypothesized that there will be no significant difference between field of study and beliefs about career patterns and labor market indicators for women with degrees in science and engineering. Thirdly, it is hypothesized that across fields, there will be no significant difference between beliefs about salaries currently earned and actual status of salaries for women with degrees in science and engineering.

Definition of Terms

"Senior women at U.T.K." refers to undergraduate women in their last quarter of study. Degrees in physical science refer to chemistry, physics, and astronomy. Life science refers to biology, botany, zoology, biochemistry, microbiology, and agriculture. Psychology refers to general and educational. Engineering degrees include nuclear, electrical, chemical, and civil. When refering to "degrees,"

bachelor and masters degrees are being referred to unless otherwise stated.

Limitations and Assumptions

The sample size is small and limited to women at the University of Tennessee. There is no control over other factors (besides their undergraduate study) which may have educated the women concerning the opportunities for women in science and engineering (for example: visits to the Career Planning and Placement Center, enrollment in women's studies courses, information from a working mother, and work experience prior to entering school). Another limitation concerns the time interval between receipt of the questionnaire and the follow-up telephone call. The women could have discovered the answers by other means during that time.

CHAPTER II

LITERATURE REVIEW

Occupational Stereotyping

To understand how people form their ideas about occupations, it is necessary to look back at elementary school. Franken (1983) asked 120 elementary school children to name their vocational aspirations and to choose whether a man, woman, or both could do the work in 30 different occupations which were depicted in a slide-tape series. This method depicted a greater number and variety of occupations than a previous study (Schlossberg & Goodman, 1972); also the slides used were actual photographs of occupational settings (showing appropriate materials, tools, machines, or background) and did not show a worker present, which could influence children to choose the sex of the worker shown as appropriate for the occupation.

Franken found that the choices children made in assigning an appropriate sex for occupations conformed to traditional sex roles. Sex typing in vocational aspirations was also indicated in the number (variety) of occupations named by children. However, when comparing Franken's findings to the findings of other studies (Hahn, 1974; Hewitt, 1975; Looft, 1971; and Swick & Carlton, 1974) it appears that sex typing occupations in accordance with traditional sex roles, may be lessening. Franken also found

that the degree of stereotyping decreased as the grade level of the respondents increased. It was speculated that this could be due to the effects of career education.

Barriers to Careers

McLure and Piel (1978) investigated student perceptions of barriers, facilitating factors, and information needs related to the consideration of careers in science and technology. Female subjects were chosen from college-bound students taking the American College Testing (ACT) assessment on the October 1975 testing date. Those chosen had a high ability in mathematics or science, however, those indicating that they planned a program of study in a field of science, mathematics, or technology were excluded. Mailed questionnaires were used to collect the data. The study found that few females were choosing careers in science and technology for several reasons. One reason was doubts concerning combining family life with a science career. Also, they lacked information about steps in preparing for a science career. Lastly, there are few examples available of the important role women can play in science. It was suggested that females need more encouragement from family, access to role models, extra encouragement and help from science teachers, and information about careers in science and the steps involved in preparation.

According to a study by Hollinger (1985), whether or not talented females will aspire to nontraditional careers in mathematics and the sciences is related to the combined influence of self-perceptions of several career-relevant abilities. A study by Hawley (1972) focused on quite a different aspect of career choice. Hawley found a significant relationship between the careers women choose and their belief's regarding men's views of the feminine ideal. Women preparing for careers in traditionally feminine fields believed men dichotomize behaviors and attitudes into male-female categories. Women preparing for nontraditional careers believed men do not see sex as a determinant of attitudes and behaviors. Also, it was found that women preparing to enter male-dominated fields were more concerned with male support than women with traditional career goals.

Labor Market Characteristics

Once women choose to enter fields in science and engineering, what can they expect in the labor market? First of all, they can expect a difference in pay (NSF, 1986) (See Table I). Except for the first few years in engineering, women are typically paid less than men for the same positions in science and engineering. This female-male salary differential has not improved during the 1980's. To be paid less, however, they must first get a job. Women

Table I. Comparison of Salaries for Men and Women in Science and Engineering According to Years Experience.

	Years of Experience		
	1-4	10-14	20-24
Physical Science			
Men	21,300	37,400	43,800
Women	20,400	32,300	36,200
Life Science			
Men	18,000	33,100	40,200
Women	15,500	26,600	34,300
Psychology			
Men	21,000	35,000	39,300
Women	15,800	31,900	29,900
Engineering			
Men	26,500	38,400	44,100
Women	26,500	37,400	39,300

Source: Women and Minorities in Science and Engineering, National Science Foundation, January 1986.

experience more difficulty in finding entry-level positions than men do. Once women obtain degrees in science and engineering, they are four times as likely to be underemployed (working in non-science and engineering positions) as men.

Women are less likely than men to hold jobs in industry. Women are also less likely to cite management or administration as their primary work activity. Blumenthal (1986) reports that despite a large increase of women entering the workforce during the last twenty years, industries are not becoming lands of top management opportunity for women. Consumer-products and technology companies are hiring some women as managers. Manufacturing and heavy industries, however, reserve their management positions almost exclusively for men. Although some women are breaking into the middle ranks, the senior posts are also reserved for men in most cases.

Women scientists and engineers are more likely to work in educational institutions than men. In academia, a smaller proportion of doctoral women scientists and engineers hold tenure or are in tenure-track positions than men. However, the number of women holding tenure is increasing more rapidly than the number of men.

Once again the question is raised, "Are women aware of the obstacles they will face once they enter the labor market?" Is this information made known to them as part of

their education during their undergraduate training? The current study shall attempt to shed some light on these questions.

CHAPTER III

METHODS AND PROCEDURES

Subjects

The subjects were women from the University of Tennessee, Knoxville in their last quarter of undergraduate work. These women had majors in physical science (chemistry, physics, astronomy), life science (biology, botany, zoology, biochemistry, microbiology, agriculture), psychology, and engineering. Subjects were selected from a list of graduating women supplied by the University of Tennessee Office of Admissions and Student Data Analysis. Permission to conduct the study using these students was granted by the U.T.K. Office of Research Compliances. All women with majors in physical science, life science, psychology, and engineering (100 women) were sent questionnaires.

Apparatus

A questionnaire was designed to assess the subjects' perceptions of the labor market for women in science and engineering professions (Appendix A). The questions referred to salaries currently earned by women compared to salaries currently earned by men, and other labor market indicators. Data reported by the National Science

Foundation in their 1986 report on "Women and Minorities in Science and Engineering" were used to form the questions.

Procedure

Subjects were mailed a cover letter explaining the study (Appendix B), a consent form (Appendix C) and the questionnaire. Subjects were told the study was being conducted to learn about how women preparing to receive science and engineering degrees perceive the job market for women in those fields today. They were asked to use the questionnaire as a worksheet and have it available for future reference during a telephone interview that would be conducted several days later. Four days after the materials were sent, a telephone call was used to collect and record the data. All data were collected during a time frame of three days.

CHAPTER IV

RESULTS

Out of 100 subjects who were sent questionnaires, 85 responded. The investigator was not able to reach 13 of the subjects by phone and 2 did not consent to participate. To test the hypothesis that no significant difference would occur between field of study and beliefs about salaries for women in science and engineering, three chi squares were performed. Each group of women, by major (physical and life science, psychology, and engineering) was compared for beliefs about each field (See Table II). Few subjects picked choices which stated a woman would make the same or more than a man (A, B, D, F, H, J), thus these categories were collapsed to prevent empty cells. Also collapsed for the same reason were the choices stating a woman would make 1,000 or 3,000 dollars less than a man (C & E), and the choices stating a woman would make 5,000; 7,000, or 9,000 dollars less than a man (G, I, & K). The chi squares performed on the responses to the salary questions were as follows: physical and life science majors (N=32) $X^2=6.15$, $p>.01$; psychology majors (N=28) $X^2=73.9$, $p<.01$; engineering majors (N=25) $X^2=28.15$, $p<.01$.

Chi squares were also performed on each question individually (See Table III). The results on questions 1, 5, and 7 were significant: $X^2=16.75$, $p<.01$; $X^2=12.16$,

Table II. Salary Beliefs of Physical and Life Science, Psychology, and Engineering Majors: Number of Responses to Each Choice for Physical Science, Life Science, Psychology, and Engineering.

Salary Beliefs of Physical and Life Science Majors	Responses										
	A	B	C	D	E	F	G	H	I	J	K
Physical Science	12	0	16	12	28	4	16	4	4	0	0
Life Science	24	0	24	0	20	0	20	0	8	0	0
Psychology	20	0	12	0	28	0	28	0	0	0	0
Engineering	8	0	16	4	28	4	20	4	4	0	8
Salary Beliefs of Psychology Majors	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**
Physical Science	10	0	15	0	23	11	17	0	8	0	0
Life Science	28	0	6	0	12	6	18	0	6	0	8
Psychology	6	0	2	10	6	0	22	0	22	0	16
Engineering	8	0	18	0	30	2	8	0	6	0	12
Salary Beliefs of Engineering Majors	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**
Physical Science	10	0	15	0	15	13	10	0	5	0	5
Life Sciences	5	0	20	0	25	5	15	0	0	0	5
Psychology	10	0	30	0	20	0	10	0	0	0	5
Engineering	5	10	25	5	20	5	0	0	5	0	0

Table III. Responses to Questions Concerning Career Patterns and Labor Market Indicators.

Question No.	Major	Responses A	B	C	D	E
1	Physical/Life Science	8	16	8	-	-
	Psychology	2	25	1	-	-
	Engineering	10	10	5	-	-
2	Physical/Life Science	12	1	12	1	6
	Psychology	5	1	12	1	9
	Engineering	5	1	5	1	13
3	Physical/Life Science	12	2	18	-	-
	Psychology	13	3	12	-	-
	Engineering	10	5	10	-	-
4	Physical/Life Science	12	4	16	-	-
	Psychology	5	1	22	-	-
	Engineering	10	5	10	-	-
5	Physical/Life Science	8	16	8	-	-
	Psychology	12	3	13	-	-
	Engineering	5	10	10	-	-

Table III. (Continued).

Question No.	Major	Responses A	B	C	D	E
6	Physical/Life Science	8	2	22	-	-
	Psychology	13	2	13	-	-
	Engineering	4	1	20	-	-
7	Physical/Life Science	8	20	4	-	-
	Psychology	2	14	12	-	-
	Engineering	10	10	5	-	-
8	Physical/Life Science	12	20	-	-	-
	Psychology	2	26	-	-	-
	Engineering	5	20	-	-	-
9	Physical/Life Science	30	2	-	-	-
	Psychology	27	1	-	-	-
	Engineering	20	5	-	-	-
10	Physical/Life Science	20	12	-	-	-
	Psychology	25	3	-	-	-
	Engineering	21	4	-	-	-

$p<.05$; and $X^2=13.41$, $p<.01$ for the questions 1, 5, and 7 respectively. These questions referred to: whether women or men are more likely to cite management as their primary work actity, how likely women are to work in educational institutions, and the increase in the rate (in comparison to men) of women holding tenure. The results of chi squares performed on the rest of the questions were not significant at either the .01 or .05 level.

To test the hypothesis that there will be no significant difference between field of study and beliefs about career patterns and labor market indicators for women in science and engineering, a chi square was performed on the total number of correct and incorrect responses made by each group of women to the multiple choice questions (See Table IV). These questions address the current career patterns and labor market indicators of women in science and engineering professions. The chi square yielded a result of: $X^2=1.97, p>.01$.

To test the hypothesis that across fields, there will be no significant difference between beliefs about salaries and the actual status of salaries currently earned by women in science and engineering, Fisher exact probability tests were run. The tests were run on the number of correct and incorrect responses to the questions concerning salaries (See Table V). Physical and life science majors were compared to psychology majors first, secondly they were

Table IV. Total Number of Correct and Incorrect Responses to Questions on Career Patterns and Labor Market Indicators.

Major	Correct	Incorrect
Physical and Life Science	160	160
Psychology	151	126
Engineering	122	128

Table V. Number of Correct and Incorrect Responses to Salary Questions.

Beliefs About Physical Science		
Major	Correct	Incorrect
Physical and Life Science	12	84
Psychology	22	62
Engineering	10	65

Beliefs About Life Science		
Major	Correct	Incorrect
Physical and Life Science	16	80
Psychology	6	78
Engineering	15	60

Beliefs about Psychology		
Major	Correct	Incorrect
Physical and Life Science	20	76
Psychology	22	62
Engineering	15	60

Beliefs About Engineering		
Major	Correct	Incorrect
Physical and Life Science	20	76
Psychology	8	76
Engineering	15	60

compared to engineering majors, and thirdly, psychology majors were compared to engineering majors. For beliefs about physical science, the first and third group comparisons were significant at the .05 level. The second comparison was not significant. The results were the same for beliefs about life science and engineering. None of the results were significant for beliefs about psychology.

Although it was not part of the original study, the number of over and under-estimations made by students across fields on questions concerning salaries was analyzed (See Table VI). A chi square yielded a result of $X^2=23.43$, $p<.01$.

Table VI. Number of Over and Under-Estimations Made by Students About Salaries.

	Estimates	
Major	Over	Under
Physical/Life Science	216	104
Psychology	150	128
Engineering	180	65

CHAPTER V

DISCUSSION OF RESULTS

Conclusions and Recommendations

The previously stated hypothesis, "there will be no significant difference between fields of study and beliefs about salaries for women in science and engineering fields" was not rejected based on the three chi squares, 2 with probabilities significant at the .01 level, and one which was not significant. No significant difference was found for beliefs of physical and life science majors about salaries across fields; however, differences were found for the beliefs of psychology majors and engineering majors. Thus, some women with different majors responded significantly different to the questions concerning salaries.

Concerning the hypothesis, "across fields there will be no significant difference between beliefs about salaries and actual status of salaries for women with degrees in science and engineering," six Fisher exact probability tests showed a significant difference and six did not. No significant difference was found concerning beliefs about psychology salaries in any group. There were also no significant differences when comparing physical and life science majors with engineering majors for beliefs about salaries in any field. The total number of incorrect responses was greater

than the total number of correct responses for women in each major. It was concluded that although there are some significant differences across fields, women (in all majors) are not well informed about salaries in any field.

No significant differences were found between field of study and beliefs about career patterns and labor market indicators. As with the questions concerning salaries, overall there were more incorrect responses than correct ones. It was concluded that women in all science and engineering fields are not well informed about their future opportunities in the labor market. It is recommended that women are made more aware of this information during their undergraduate training. Providing college women in science and engineering with data such as that presented by the National Science Foundation (1986) would help educate women in their chosen professions.

There is a significant difference across fields between the occurrence of over and under-estimations concerning salaries. Overall, women tended to over-estimate salaries for women in science and engineering when comparing them to salaries for men. Further analysis of the present data and further research need to be done in this area.

Suggestions for Future Research

The present study could be expanded by a closer examination of whether women tend to over or under-estimate

their opportunities in the labor market. The perceptions of men concerning their own status and the status of women in the science and engineering labor market should also be investigated. Since this study was limited to women at the University of Tennessee, it is suggested that a study be conducted to investigate the possibility of regional differences.

The perceptions of freshman women concerning the science and engineering labor market could be compared with the beliefs of women preparing to graduate to investigate whether or not there are differences between them. A broader study may also include graduate students. To expand on this study even further, the beliefs of the women (and/or men) could be compared to their personality types as measured by the Holland Self-Directed Search, to investigate the possibility that perceptions are related to personality type.

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APPENDIXES

APPENDIX A

WOMEN IN SCIENCE AND ENGINEERING PROFESSIONS

The women referred to in the following questions have either bachelors or masters degrees unless otherwise indicated. They hold positions in physical science (chemistry, physics, astronomy), life science (biology, botany, zoology, biochemistry, microbiology, agricultural, and medical sciences - except those primarily engaged in patient care), psychology, and engineering. Their primary work activities include:

-management or administration of research and development
-management or administration of other than research and development
-teaching and training
-basic research
-applied research
-development
-report and technical writing, editing, and information retrieval
-clinical diagnosis, psychotherapy
-design of equipment, processes, models
-quality control, testing, evaluation, or inspection
-operations: production, maintenance, construction, installation exploration
-distribution: sales, traffic, purchasing, customer and public relations
-statistical work: survey work, forecasting, statistical analysis
-consulting
-computer applications
-other activities

Fill in the chart below according to how much money you believe women in the fields listed and with the indicated years of experience would make in comparison to how much a man with the same amount of experience, background, and other qualifications would make in the same field. The choices (A-K) may be used more than once or not at all.

yrs. exp.:	1-4	10-14	20-24
Field			
Physical Sci. (chemistry, physics, astronomy)	C*	G*	I*
Life Sci. (biology, agriculture, medical, botany, zoology, biochemistry, microbiology)	E*	I*	I*
Psychology	G*	E*	K*
Engineering	A*	C*	G*

Choices for Chart

A. same as a man
B. 1,000 more than a man
C. 1,000 less than a man
D. 3,000 more than a man
E. 3,000 less than a man
F. 5,000 more than a man
G. 5,000 less than a man
H. 7,000 more than a man
I. 7,000 less than a man
J. 9,000 more than a man
K. 9,000 less than a man

For numbers 1-10 answer according to what you believe the labor market is currently like for women.

1. Women are _____ to cite management or administration as their primary work activity.

   a. equally likely as men
   * b. less likely than men
   c. more likely than men

   * Indicates correct answer.

2. Women and men are

   a. equally as likely to be underemployed (working in non-science and engineering positions)
   b. men are twice as likely as women to be underemployed
   c. women are twice as likely as men to be underemployed
   d. men are four times as likely as women to be underemployed
   * e. women are four times as likely as men to be underemployed

3. Women scientists and engineers are _____ their male counterparts.

   a. the same age as
   b. older than
   *c. younger than

4. Women scientists and engineers are _____ their male colleagues to work in industry.

   a. equally as likely as
   b. more likely than
   * c. less likely than

5. Women scientists and engineers are _____ their male colleagues to work in educational institutions.

   a. equally as likely as
   * b. more likely than
   c. less likely than

6. In academia, a(n) _____ proportion of doctoral women scientists and engineers hold tenure or are in tenure-track positions than as men.

   a. equal
   b. larger
   * c. smaller

7. The number of women holding tenure is

   a. increasing at the same rate as men.
   b. increasing at a slower rate than men.
   * c. increasing more rapidly than the number of men.

8. _____ experience more difficulty in finding entry-level positions.

   a. men * b. women

9. _____ scientists and engineers are more likely to hold jobs in science and engineering.

* a. men b. women

10. The female-male salary differential _____ improved during the 80's.

a. has * b. has not

What is your major? _____

APPENDIX B

Dear Senior at U.T.K.:

Like you, I am preparing to graduate. I am working on my master's thesis in the College of Education. I am interested in women's beliefs about the current status of the job market for women in science and engineering.

To learn about this, I need your help. Enclosed you will find a questionnaire which asks about your beliefs about salaries and other labor market indicators for women in science and engineering. Please take a few minutes to answer the questions and keep them handy. In a few days I will be calling you to record your answers.

I appreciate your assistance and congratulate you on your upcoming graduation.

Sincerely,

Cynthia Shinaharger

Cynthia Shinaharger

Enclosure

APPENDIX C

CONSENT FORM

The purpose of this study is to determine how graduating women in science and engineering perceive the job market ahead of them. You will be asked a number of questions concerning your beliefs about salaries and job opportunties for women in scientific and engineering positions. It will take approximately 20 minutes to answer the questionnaire. Please use it as a worksheet and keep it handy. In a few days I will call you to record your answers.

This study will help us determine what women are learning about their career opportunities while they are in college. Although the study may have no direct benefits to you at this time, the results may help college women become more aware of their opportunities. There are no known risks involved in this study.

Your identity will be kept confidential. Your name will not be recorded. Once I record your answers they will be kept in a locked file in the Educational and Counseling Psychology Department. Only aggregate results will be reported, and your individual questionnaire will be destroyed as soon as the results are statistically compiled.

If you have any questions about the research, either now or later, please contact Cynthia Shinabarger at 588-0805 or Dr. Peterson in the Educational and Counseling Psychology Department at 974-5131. Your participation in this study is voluntary. You may withdraw at any time during the study without penalty.

Responding to the phone call by answering the questions will constitute your agreement to participate in this study.

VITA

Cynthia Kay Shinabarger was born in Elkhart, Indiana on June 22, 1965. She received her high school diploma in 1981 from American School in Chicago, Illinois. At age 16 she began her undergraduate study at Indiana University, South Bend (IUSB). During her senior year she served as president for the IUSB Psychology Club, and also served as the first president of the IUSB Women's Association. In the spring of 1985, at age 19, she received her Bachelor of Arts degree in Psychology. During the fall she began study toward a Master of Science at the University of Tennessee, Knoxville. This degree was awarded in June 1987.

The author is a student affiliate of the American Psychological Association. She is also a member of the National Association for Female Executives.