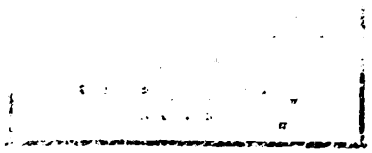

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A DESCRIPTIVE STUDY OF THE RELATIONSHIP AMONG SEX-ROLE, SELF-CONFIDENCE, AND CAREER SELECTION IN WOMEN RETURNING TO COLLEGE

BY

JILL LOSEE HOEHLEIN

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ABSTRACT

A DESCRIPTIVE STUDY OF THE RELATIONSHIP AMONG
SEX-ROLE IDENTITY, SELF-CONFIDENCE, AND
CAREER SELECTION IN WOMEN
RETURNING TO COLLEGE

By

Jill Losee Hoehlein

"I've never been good in science" is a phrase so typically spoken, either explicitly or implicitly, by females that it is currently a generalized sex-stereotype of females. Why is this so, and how can one explain and predict its occurrence? With over 40% of our country's paid labor force being female, one discovers only a limited number in the scientific fields (41% in the life sciences, 23% in the physical sciences, and about 5.8% in engineering). Does the lack of female role models impact on selecting one of these careers, or are other factors playing a role in this scenario?

Over many years math has been seen as a filter for entrance into the sciences, while at the same time numerous studies have demonstrated that females have lower aptitude scores in math. These low scores have been attributed to a variety of influences, including right/left brain dominance, sex-influence, length of exposure to the subject, and teacher attitude. The research considered another possibility--that a female's perception of self, her self-confidence as well as sex-role identity, was really the ultimate critical filter.

The relationship examined the connection among a woman's sex-role identity, self-confidence level, and her selection of a career in one of the sciences. It was hypothesized that the more

self-confident and androgynous a woman was, the more likely she was to select a scientific or science-related career.

The sample had been drawn from female community college students (30 years old or older) who had just recently returned to a formal learning environment after being away from an academic environment for five or more years.

The following major conclusions were reached based on the research findings:

1. In adult females there was a high correlation between sex-role identity and self-confidence. A woman with an androgynous sex-role identity was more likely to have a positive self-confidence level.

2. There was no statistically significant prediction of sex-role identity or self-confidence, alone or jointly, upon career selection.

Recommendations were suggested for future research based upon the various questions raised by the study.

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This dissertation is dedicated to those below who were always there when I needed them:

my parents, Joseph and Dorothea Losee,
who instilled in me a desire to strive
for the highest point,
my husband, Richard Hoehlein,
who always cares and believes in me, and
my children, Robb and Heather Hoehlein,
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to live than any two people.

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Chapter 1

INTRODUCTION

In the world of today a country cannot afford to discourage (covertly or overtly) its population from reaching their fullest potential. Conditions which inhibit the complete development of an individual jeopardize the well-being of the whole nation as well. This study was designed to examine and propose possible explanations as to why so few women are found in science-based careers. It was also the purpose of this study to discuss key issues related to the impact of self-confidence and androgyny on career selection among females.

Both recent and earlier studies have dealt with achievement and attitudes of males and females regarding science and mathematics. In general, a sex difference in math performance has been noted but a lack of assuredness as to the origins of that difference (innate or learned) has been seen in the conflicting results of the studies. There also appears to be a high correlation between success in math and science. Two factors described as inhibitors to science development are a lack of encouragement and a poor mathematics foundation.

The adult learner suffers anxiety on many fronts, especially following a hiatus from a formal learning environment. Anxiety in the scientific academic arena rises as one encounters an increase in mathematical content. [Docking, 1979] This anxiety has been traced to

the number of years the individual has been out of school, the recollection of success or failure in high school, peer comments, and previous math background. This "mathophobia" is seen indirectly in their career selections--an avoidance of science-based careers. Math then appears to be well-documented as one of the critical aspects towards reaching a career in science. [Sells, 1976] However, it was the purpose of this research to show that math was not the only "critical filter" to a career in science. Both self-confidence and one's sex-role identity aided in the determination of whether one chose (or even considered) preparation for a career in a science-related career.

STATEMENT OF THE PROBLEM

This researcher has been sensitive to the career attitudes of both female students and non-students over several years. While a graduate assistant as well as an adjunct faculty member at different institutions, this researcher faced many uncertain women. This uncertainty (even on the first day of class) seemed to be expressed by the spoken "I've never been good in science," and the unspoken "therefore, I can't understand or become good in science." So few aspired to a career in the sciences and few had or were fully prepared for opportunities in these fields. Even with approximately 40 percent of the paid-labor force being female, very few are found in the fields of mathematics, computer science, and the life sciences (41 percent), only 23 percent of all physical scientists are female, and about 5.8 percent of the engineers. [Weiss, 1982]

The feminist movement, ERA, and other social happenings of the last decade have apparently not caused the expected radical change in the percentages of females in these careers or their aspirations towards these avenues. Unfortunately the lack of movement in this direction appears to have firm foundations: 1) lack of previous experience and/or preparation in the field of mathematics by adult women and the continuing avoidance of advanced mathematics by female high school students, 2) lack of appropriate role models, 3) degree of disparity between the occupational-self and self-concept, 4) low level of personal self-confidence, and 5) type of sex-role ideology. [Sherard, 1981; Super, 1963; Broverman et al, 1972; Lipman & Blumen, 1972]

The research question quite simply can be stated as "What is the likelihood that selecting a science-related career is more apt to occur if one has a high level of self-confidence and an androgynous sex-role identity?"

The hypotheses that will be examined are:

1) As self-confidence increases so does the probability that a woman will choose a science-based career.

2) An androgynous sex-role identity in women is positively related to the choice of a career in science.

3) When both self-confidence and an androgynous identity are present, a woman is more likely to select a science career. Conversely, a woman in or selecting a "pink collar" job/career would be less self-confident and have a feminine sex-role identity.

DEFINITIONS

The following terms have proven useful in the research and literature review. Their definitions are commonly accepted in the

professional literature. However, to avoid any untoward assumptions upon their meanings, the researcher will define them according to usage throughout this report, as follows:

ANDROGYNOUS - having attitudes that are associated as belonging both to males and females, while being neither one or the other.

SELF-CONFIDENCE - belief in oneself and in one's powers and abilities.

SEX-DIFFERENCE - any variance in scores--aptitude, achievement, attitude--that separate or distinguish a person by sex.

SEX-ROLE PREFERENCE - desire to adopt the behavior associated with one sex or the other or the perception of such behavior as preferable.

SEX-ROLE IDENTITY - an underlying, not necessarily conscious, perception of the maleness or femaleness of the self--an aspect of self-concept.

PROCEDURES

The survey population that was examined is the adult female community college student, 30 years of age or more, who had returned to a formal learning environment after a hiatus of 5 or more years.

This population was evaluated as to their self-confidence, perspective of self as androgynous, and interest in various careers.

Since the research model was a correlational study of significant factors related to career selection by the research

population, multiple regression was selected for analysis of the data collected. By utilizing multiple regression, the individual and combined effects of the two independent variables were examined in relation to the criterion variable--science careers.

LIMITATIONS

This study concentrated on the impact of self-confidence and androgyny upon a person's perception of science, and how the interrelationships of these variables affects career options. The research was not designed to examine whether math ability was the "critical filter" to the pursuit of scientific studies or careers. Nor did it consider the question of whether math and science aptitude is based upon innately governed sexual differences or socially-derived manifestations.

The boundaries and focus of this project were therefore restricted; the results of a variety of previous studies provided the framework for the hypothesis, assumptions and discussion of any findings which were generated.

The community college was chosen as an appropriate site because it has historically taken an active role in the retrofitting of adults for new careers, and in providing an access to higher education for non-traditional students.

The population chosen was unique in that it constituted females who have already made the decision to return to a formal learning environment. These students probably form a different population than those who feel "closed out" from any opportunities. (This other arena

would provide fertile ground for future research.) Therefore, the conclusions of this study will only directly apply to this special population, though hopefully, it may extrapolate to other, yet similar, populations.

Another limitation was the attempt to evaluate a self-report survey versus actions and then correlate them, since it provided many avenues for misinterpretation. "Are you saying what you think I want to hear or what you truly believe?" Much of the literature regarding instrumentation of personality factors was resplendent with cautions in this area.

This exploratory and preliminary study attempted to help define the problem and suggest possible relationships between concepts that may prognosticate various remediative approaches.

SIGNIFICANCE OF STUDY

In today's rapidly evolving world, math and science are truly survival skills--public environmental decisions, energy problems, computer technology, genetic engineering, and numerous other contemporary concerns require that a nation have a citizenry that is scientifically and mathematically literate and capable of informed action rather than merely reacting in a confused or simplistic way to complex issues or problems, whether personal, societal, or global. Any biased behavior inhibits the development of a fully functioning person as well as the society.

Several studies have looked at the career aspirations and achievement of women, and have focused upon the idea that choosing a career is not a simple, casual, or random process. It is, rather,

influenced greatly by how a woman sees herself--in terms of her sex-role and her self-confidence. These self-images appeared to be major factors in her view of what careers were acceptable and reasonable to pursue. Yet much remains to be learned about how these particular aspects of the self can serve to predict and/or help mediate career choices for women.

Among the relevant findings from recent studies was McCarty's investigation of the comparative advancement of men and women holding management positions in business firms. She examined the relationship of sex and self-confidence in order to find out why more women were not "making it to the top." Her study revealed that males possessed significantly higher confidence estimates of self than females, regardless of feedback on equivalent tasks. However, her study left unanswered the question of whether these outcomes were related to innate sex differences or sex-role impacts. [McCarty, 1982]

This issue received attention in a study of developing sex-role stereotypes among junior high school boys and girls, conducted by Chandler, et al. These researchers concluded that a "vicious" self-fulfilling cycle is perpetuated as long as "there are personality sex-role stereotypes associated with occupations, coupled with under-representation by one sex . . ." [Chandler, Sawicki, Stryffeler, 1981, p. 105] They suggest that providing effective role models which emphasize greater variability within sex, rather than inter-sex variance, may break or weaken the cycle.

As a person's sex-role identity emerges and takes shape, another important dynamic must be considered--namely, the interaction with one's feelings of self-esteem. Corbett's use of the Tennessee Self-Concept Scale to determine how these variables might be related revealed that,

in both female athletes and non-athletes, positive feeling of self-worth were inversely related to self-perceived level of femininity. [Corbett, 1982] McCutcheon confirmed the same finding--in short, the more feminine a person felt, the lower self-confidence they possessed and vice versa. [McCutcheon, 1983]

It is hoped that the findings of this research will further clarify the impact of self-confidence and sex-role identity on the academic and career selections of women, and will thereby provide insights that are helpful in making wider ranging occupational choices and plans. This study should also stimulate consideration of alternative strategies that can be used by academic and vocational counselors in guiding female students in the examination of career options.

This anticipated outcome is of particular significance for several reasons: 1) much counseling literature still stresses the "proper" matching of traditional female roles and career expectations; 2) counselors are often bound by their own sexual stereotypes when advising females concerning career and academic planning; and 3) contact time between counselor and counselee is too short for significant interchange. [Karpicke, 1980] Perhaps through the multiple correlations of factors addressed in this study, one will be better able to acknowledge the multiplicity of potentials within individuals, rather than relying on sex stereotypes in the shaping of career goals.

In addition to its predictive value, this research study also has prescriptive applications, in that women who may have avoided certain careers could now be encouraged, through counseling focused on the two variables studied (self-confidence and sex-role identity), to

consider new possibilities after these concerns had been resolved. . . . Perhaps by providing broader choices and by recognizing that self-perceptions are modifiable the issue of limited appropriate role models and restrictive career selection processes for women may eventually be eliminated as areas of concern. [Fox, 1980; Burgoyne, 1979; Greenfeld et al., 1980; Guttentag and Bray, 1976; Hartley and Klein, 1977; Krefting et al., 1978; Lunneborg, 1979; Siegfried et al., 1981]

Chapter 2

REVIEW OF LITERATURE

INTRODUCTION

Why are there so few women in science-based careers? Is it due to some masked innate trait? Is the lack of role models in science a stumbling block? Does one's self-definition of ability interfere particularly with a science career?

In this chapter the researcher shall examine some of the pertinent findings that are believed to enhance an understanding of this complex issue. The study has sought to be rather eclectic, because it is the belief that the problem is multifaceted.

The areas reviewed are: 1) relatedness of academic study in the math and science disciplines, 2) sex-based difference, 3) attitude impact upon learning, 4) the effect of anxiety on attitude and career selection, and 5) the importance of appropriate role models.

MATH AS RELATED TO SCIENCE

One of this researcher's basic assumptions when reviewing the literature and developing a perspective on this topic has been that math and science are highly intertwined, both in preparatory skills and attitude. In both these areas one finds an under-representation of females in courses in secondary, under-graduate, and graduate schools. One also becomes aware of the historical-social code--i.e., this is a "man's" field.

Is the dearth of females in careers related to these two fields due to a lack of ability or aptitude, low-level preparedness, or avoidance due to sex-role stereotyping? As academic disciplines, to what extent do science and math interact with each other (and with what effects) in terms of generating this apparent difference in proclivity between males and females?

Perrodin in early research observed elementary students' attitudes toward science in the fourth, sixth, and eighth grade--in both the fourth and sixth grade both sexes were equally positive regarding science but by eighth grade, even though both were less positive, males were more positive than females. It was also at this age that he noted females become more positively inclined toward the language arts and males with math. [Perrodin, 1966]

When Taiwo studied teachers and their proclivity toward science he discovered even though previous exposure to science increased their positive feelings, male teachers were much more inclined toward teaching science in the classroom. He concluded that gender appeared more important than previous science experience. [Taiwo, 1980]

When Erlick and LeBold studied factors that affect career selection in females, they found that while males were more likely to be involved with the physical sciences, females entered the helping aspects of the life sciences (i.e., nursing). They also noted that females with science interests showed similarities with their male peers in interests, desire for achievement, married later, and combined career and marriage. When pro-science students were grouped as to use or ability to use power tools there was no sex difference; however, if the

general student population was examined, significant differences appeared—use of a voltmeter [had experience--38 percent of males, 6 percent of females], use of a power tool [75 percent of males and 13 percent of females had some experience], and designing clothes [25 percent males, 51 percent females]. [Erlick and LeBold, 1977, p. 35] This lack of experience with some of this equipment put the typical female at a disadvantage when a course presupposes this knowledge or vocabulary either in content or in testing procedures. Within this study two other factors emerged as hindrances to the development of a positive science attitude--lack of encouragement from teachers, peers, parents, and society, and low self-confidence regarding science and math abilities. [Erlick and LeBold, 1977]

Vockell and Lobonc in a more recent study looked at this avoidance of physical science in a new way. They compared the attitudes of female high school students in coed and non-coed situations. Vockell and Lobonc found that girls, even though they still viewed physical science as a male-dominated field, were less likely to be inhibited from taking the course in a non-coed classroom. They concluded 1) that the females in the coed situation felt like a deviant minority, therefore they either avoided the course or developed a "failure to thrive" behavior pattern, and 2) the teachers, as well as peers, conveyed greater acceptance of females in the biological sciences than in physical science. [Vockell and Lobonc, 1981]

DIFFERENCES BETWEEN THE SEXES

The question as to whether there are learning or aptitude differences between boys and girls has been examined and reexamined many times. Maccoby and Jacklin's review of research pointed out that there

was no difference in how the two sexes learn--the allegation that girls learn best by rote, while boys learn by a more advanced form of reasoning was clearly not supported. In their results with 2-7 year olds, they observed no learning advantages of females over males, and that intellectual and physical maturation were independent. [Maccoby and Jacklin, 1974 p. 62] Somewhere during adolescence (9-13 years old), males did begin to show superiority in math, not just in training but also interest and mastery, this also was noted in science. They wondered if the differences in verbal and visual-spatial abilities they observed to appear at this same time accounted for the variance. However, they reported that when Witkin had tested disembedding on blind students (therefore no use of visual-spatial skills) no sex differences had been found. This caused Maccoby and Jacklin to deduce that the female's poor performance in visual-spatial tasks may only be due to less acuity on the task, not on discontextualization. [Maccoby and Jacklin, 1974]

When earlier research in this area was looked into, it was found that some support for the belief in sex-linked inheritance patterns existed, but contemporary research on this theory has been limited. Shucard, a neurophysiologist, reported in 1982 that the rate of development in the maturation of the cerebral hemispheres may affect task development. He noted differences in cerebral maturation between males and females based upon the level of testosterone in each. [Shucard, 1982]

Sex differences among adolescents have also been studied, revealing consistent results: 1) females increased in verbal acuity, 2) males increased in visual-spatial skills, and 3) males increased in math

ability. Dwyer suggested that modelling is an important factor toward the building of a reservoir of behavior and that the knowledge of the "appropriateness" of behavior impacts upon the repertoire of behaviors which a person utilizes. [Dwyer, 1974] However, the prestige of the model may be able to over-ride its sex-appropriateness (ex. Billie Jean King - athletics).

Since many of these early studies there has been much written that debates this issue of innate sex-difference. Some of the newer studies challenge the earlier results by saying that exposure to mathematics and attitudes regarding the importance of mathematics were the causes of the differences noted between males and females in math ability. Wise, Steel, and MacDonald noted that while 9th graders were similar, 12th graders showed that the males had gained a significant advantage in math ability. This was attributed to participation in math courses, since when the data was further analyzed to take into account the number of math courses taken, the sex differences among the seniors vanished. [Wise, Steel, and MacDonald, 1979]

They also observed that interest in math or math related careers directly correlated with achievement. It was noted that most of the male-dominated fields required college math, yet even though the differences are being minimized today, less than 50 percent of the women entering college have the prerequisite skills in mathematics required to enter the technical fields. A 1981 study by Becker that attempted to document any teacher-student treatment differentials noted that incoming freshmen at the University of Maryland arrived with sex/race differences in mathematics experience. Fifty-three percent of entering white males and 22 percent of black males had had four years of high school math,

whereas only 20 percent of white females and 10 percent of black females had a similar background. [Becker, 1981] This would certainly add to the higher attrition rate for women in majors in the physical sciences and math and continue the dearth of role models for the next generation. The absence of role models in these fields helps to continue the perception of both fields as male-domain and therefore unrelated to a woman's career aspirations.

When Becker looked at the behavior of high school math teachers, she discovered a significant disparity between the treatment of students which followed a sex difference pattern--this was true regardless of the sex of the teacher. Males received more sustained interaction (64 percent to 54 percent for females), more teacher initiated contact (63 percent of the time even though classes were 50:50), males received 70 percent of the positive encouragement while females received 90 percent of the discouraging statements, and the level of expectation was greater for males—if a female received a high grade it was due to her "doing all her assignments on time," not her ability. She also commented on the learning environment, and saw that both the textbooks and bulletin boards further enhanced the sex-role stereotype; even the female teachers denigrated themselves (especially in spatial or mechanical areas) by asking the boys for help on certain problems. With all these selected behaviors by the teachers, the female student was noted to become more passive, less questioning, and more likely to look for the nearest exit.

Hashway tested college freshmen in order to detect achievement differences between the sexes. He found that in three of the eight domains tested he could find sex-related differences. Females showed a

higher acuity with fractions, while males were more proficient at problem-solving using geometric principles and ratios. He concluded that though these were statistically important about 98 percent of these differences could be attributed to some other characteristic. [Hashway, 1981]

Fox in a recent summary of this issue on women and their math ability concluded that the studies on achievement have shown mixed results but that it was the attendance in the classroom that was the major factor; one can't achieve, if one has never been there! [Fox, 1980, p. 13] Also, the learning and application of math knowledge and the development of mathematical skills outside the classroom appeared to be made more available to or encouraged in males. [Fox, 1980, p. 10] This would then raise, in males, their perception regarding the importance of mathematical skills, which would in turn encourage male attendance in math courses while covertly discouraging the females. [Fox, 1980]

ANXIETY AND SELF-CONFIDENCE

Anxiety in high school students was examined by Docking and Thornton. They noted that an anxious student tended to be more conforming, more insecure, and more self-deprecating (especially so if the student was female). [Docking and Thornton, 1979] Sex differences affected the choice of coping mechanisms used with an anxious situation--females depended on peer support, while males attempted a head-on course of action. Both teachers and students had a defined sex-role for females that conflicted with the role of intellectual, academic pursuit. This conflicting interface between roles and ideal

versus perceived self produce an even more anxiety-laden environment. On top of the anxiety from role conflict, they noted that as the level of mathematics increases so does anxiety, regardless of sex. However, math and science produced the highest anxiety level in females. The correlation between performance and attitudinal differences towards math and problem-solving had been noted by Fennema and Sherman in 1975.

Matching Sherman's results on self-confidence, Richmond found that women who were numerically inclined, showed less self-abasement, and scored higher on dominance, and were more likely to directly pursue their educational and/or vocational aspirations, while those with low dominance ratings, high self-abasement, and poor numerical ability were more likely to depend upon and seek out guidance courses and/or aid. [Richmond, 1972]

Several researchers noting these correlations have proposed a variety of ways in which to mediate the situation. Sherard suggested the following steps:

1) avoid sex-role stereotyping

2) relate math to everyday use and need in future occupations

3) purposefully attempt to enhance positive self-confidence regarding the subject

4) students should have time to work on both problem-solving and visual-spatial skills.

After all, when a swimmer has a weak kick, one strengthens the kick, not the arms. To neglect the final suggestion that a math course incorporate both necessary skills, is to deny access to and increase anxiety about mathematics for a large number of students. [Sherard, 1981]

NIE funded a research project by Sherman that showed self-confidence in math learning ability affected both performance and participation in mathematics. In female students ability in visual-spatial skills (the ability to comprehend visual organization of and to reorganize it) correlated greatly with the number of years and the grades received in mathematics classes. Spatial acuity was shown to be highly related to mathematical problem-solving ability, yet females were consistently less likely to use this skill, and were more likely to solve these problems primarily through a reasoning process. [Sherman, 1979] If spatial ability is so important to math, why isn't it a part of the curriculum?

This lack of visual-spatial skill has been consistently reported as one source of sex differences; however, Sherman found that for females, self-confidence correlated almost as highly, and for males it had a greater significance than visual-spatial skills. Self-confidence in math was related to the interpretation of math as a field in the male domain--low self-confidence produced a higher view of math maleness and a subsequent lower success rate for females. [Sherman, 1980]

Sherman also discovered more sex-role conflict than expected in female students taking a lot of mathematics courses. These students had a supportive and encouraging environment that helped them through the effects of the sex-role strain. Fifty-one percent of these students declared that they would be embarrassed if others knew they were smart, 74 percent felt that other female students played dumb, and many still felt that math was more crucial to males in their career development. [Sherman, 1980]

With all these negative affects it was concluded in a study at a community college level that with modified (not remedial) instruction and intentional attitudinal and self-confidence building, students' fears lessened while computational skills increased and career choices expanded to include a wider variety of careers. [Baylis, 1979]

SEX ATTITUDES

The following definition provided by Koballa and Coble is helpful in the discussion of attitudes. An attitude--positive or negative--is feelings, opinions, beliefs in and about, and appreciation which individuals have formed as as result of interacting directly or indirectly with various aspects of enterprise which exert a direct influence on their behavior. [Koballa and Coble, 1979]

A Likert-type scale was formulated by Stein and Smithells in order to categorize attitudes regarding femininity and masculinity in academia. The results equated femininity with one being artistic, social, and having good reading skills, while masculinity was associated with math, spatial, mechanical, and athletic ability. The researchers inferred that if students saw an area as the sex-role standard, the performance level by the student may be directly influenced. Male students saw themselves as more astute in math and better suited to leadership, therefore, one may presume that the student would seek out opportunities in these areas of probable success. [Stein and Smithells, 1969]

Approximately ten years later, Tremaine and Schau studied students in order to evaluate the sex-role aspects in the development of career awareness. In children, females selected a nursing career twenty

out of twenty-nine times. (This was also supported by other researchers--ex. Chandler et al., 1981). By high school, 50 percent of the females named only three careers out of twenty-five as providing opportunities. These three careers were clerical, educational, and social service. Yet it was observed that males were even more rigidly conforming in their selection. [Tremaine and Schau, 1979] Dwyer had previously found that this apparent male rigidity in role selection may be a function of more strict social sanctions against males entering a female sex-role career. However, she noted that this tendency decreases with age. [Dwyer, 1974]

Careers were further stereotyped according to worthiness, the typical male careers being defined as more important to self and society. Deaux and Emswiller concluded that males generally attribute their success to skill and ability (while females attributed success to luck), therefore, not only were males perceived as more skillful, regardless of career task, but also more worthy. [Deaux and Emswiller, 1974]

In a later study by Chandler, Sawicki, and Stryffeler eighth graders were found to believe that the most important role for a woman was still a wife and mother (78 percent of the males and 61 percent of the females responded in that manner) even though the feminist movement had existed almost throughout their lives. Both sexes believed that they would rather work under male leadership and that competitiveness was unfeminine. The researchers concluded that as long as there were personality sex-role stereotypes associated with occupations, coupled with an under-representation of either sex, the vicious cycle of

sex-stereotyping will continue. Yet they felt there was a ray of hope because when an appropriate sex role model was presented or the mother worked out of the home, the children appeared to be released from defining a person or a career with sex-role rigidity. [Chandler, et al., 1981]

ROLE MODELS

In any discussion regarding sex role models, one must first define the terms male and female (at least in a socially acceptable normative sense).

Carole Beere defines femininity as referring to personality traits, interests, and behaviors that either are, or are believed to be, more characteristic of females than males. [Beere, 1979] She provides a similar definition for masculinity. But what are theses traits, interests, and behaviors?

Horner felt that society fostered an image that emphasized tenderness and compassion at the expense of other, also valuable, talents and emotions. This led to careers in the "helping professions" (nursing, social work, teaching) as being socially acceptable careers for educated women. [Horner, 1974]

Guttentag and Bray, after examining other studies, developed the following criteria which seemed to cross the lines of age, sex, marital status, or education:

Male	Female
independent	absence of male traits
decision maker	gentle
objective	follower
self-confident	tactful
leader	neat
active	religious
logical	quiet
competitive	
adventurous	
worldy	

Even mental health professionals defined healthy women as submissive, less independent as compared to healthy mature men. [Guttentag and Bray, 1976]

When Guttentag and Bray looked at children's belief patterns, they found that: 1) there was less resistance to a female in a non-traditional role than a male, but she had less status, competency, and was viewed as a "helper"; 2) males suffered more pressure towards success since they MUST work as opposed to women who only work if they wish; 3) females were best at caring for others and performing "at home" tasks; 4) women were always viewed in relation to men; and 5) women MUST first complete their chores (home/family care) even if they choose to work outside the home. The children they studied showed that they were least sexist about themselves, slightly sexist toward same-sex peers, but very sexist regarding opposite-sex peers.

The generalizations they garnered from their study on sex-role stereotypes indicated that these attitudes were difficult to change at any age, that females try to combine home and career roles (the super-woman syndrome), and that the male role is more inflexible than the female role. They also concluded that mass media, peers, and the schools were a more powerful influence upon students than the family.

Research has shown that females generally underestimate their ability, while males overestimate. [McCarty, 1982] When achievement scores were examined they showed that an individual had a higher score on those tasks that matched their role definition. Kagan when studying the impact of school and sex role development noted that in elementary school the apparent superior academic performance among females may be in part related to the fact that the school is viewed as more congruent with their sex-role. His basic tenet was that the child is motivated to master tasks perceived as appropriate. [Kagan, 1964] How do the schools which are geared toward encouraging and measuring achievement affect their students?

In the traditional school, teachers play an important role in sex-role development. "The most powerful predictors of attitudinal change in students were the enthusiasm and convictions of the teacher." [Guttentag and Bray, 1976, p. 302]

Even though most teachers would state that they treat all students equally, there are mounds of studies that indicate otherwise. A majority of teachers described the behavior or performance of each sex differently, 50 percent of the teachers felt they had no right or business to try to change their students' attitudes regarding sex role, most showed lower approval levels for a dependent male than an achieving or independent female, most teachers preferred male students because they were seen as more intellectually stimulating, and teachers interacted more with male students (both student and teacher initiated contacts). The only preference for having female students was based upon the ease of disciplining them. The pattern of interaction differed as well--teachers reacted more loudly with males, affording them a

greater range of mobility. When both sexes were close to the teacher, they received equal treatment; this encouraged female students to maintain closer proximity. [Becker, 1981; Guttentag and Bray, 1976; Fishel, 1977]

Of course there is also the typical make-up of the school--85 percent of the teachers are female, 79 percent of the elementary administrators are male. Plus the teacher seeks help, when necessary, from the principal. This again reinforces the sex-role stereotypes of leader/problem-solver to follower/illogical thinker. [Fishell and Pottker, 1977 and Gough, 1976]

Another aspect of schooling is the literature provided for student use upon entering public school. Brody, as reviewed by Pugliese and Chipley, indicated sex-typing was an important factor in the governance of behavioral development, motivation, and self-concept. The effect of stereotyping in childrens' media limited the opportunities for personal growth and was negative in terms of producing healthy adults. [Pugliese and Chipley, 1977]

According to Tiedt the strongest socializing influences were found in a child's book. In several studies she tabulated, children's books had the following characteristics: 75 percent of the characters in the stories were male, there were six times as many biographies about men, and there were six times as many occupational opportunities mentioned in reference to males. [Tiedt, 1976] Another 1976 study done by the Children's Rights Workshop reported that in the prestigious Caldecott Award books human, male characters were eleven times as frequent as females, about 95 percent of the non-human character were male, and the roles that each performed were very traditionally sex-stereotyped. [Children's Rights Workshop, 1976]

Milton noted that most tests were constructed in masculine terms. When they switched to feminine or androgynous terminology there was a rise in the scores of female students. This led to less apparent sex difference in scores. [Milton, 1959] Similar findings were noted in many standardized tests (ACT, SAT, CEEB). [Frazier and Sadker, 1973; Guttentag and Bray, 1976; and Fishel and Pottker, 1977] Is it not easier to change the test rather than the student?

With the increase in women in the paid work force, several studies have looked at the impact on the working mother on the sex-role identities of her children. Broverman noted that the daughters of these women defined women less negatively, while their sons saw nurturance and warmth emanating equally from their parents as well as being more egalitarian in role appropriateness. [Broverman, et al., 1972] Hartley and Klein concluded in their report that age or sex was less decisive in developing role concepts than the working status of the mother. [Hartley and Klein, 1977]

The effects of parents in general upon role identification as well as mathematics participation has been documented in several studies and the impact of the father upon the female child was seen as crucial in these areas. If the father was very accepting of the daughter or was overprotective, it was more likely that the daughter would migrate toward the homemaker role. But, if he was more demanding regarding achievement or encouraged independence, the daughter leaned toward a career. [Oliver, 1975 and Lozoff, 1974] This influence was again mentioned by Fox when she also noted that other researchers had compared parental expectation level to role models, and found that parental expectations were more closely related to achievement in daughters than sons. [Fox, 1980]

An enlightening project by Walberg in 1969 attempted to examine the traits of eminent scientists and relate them to femininity and creativity. This project was in response to an earlier study which had shown that for females there was little correlation between IQ and occupational levels attained. Walberg described a scientist as a person with 1) a high degree of autonomy, 2) a preference for mental manipulations of objects not people, 3) a distant attitude toward personal relationships, 4) a high degree of personal dominance and self-control, and 5) an enjoyment of abstract thought marked by independence of judgement. Since the above traits are more compatible with the stereotypical male, it presents to females a role conflict. [Walberg, 1969]

Torrance also studied scientific thinking as related to sex-appropriate behavior and found that although girls frequently received high grades, they lacked persistence and task focus. This he attributed to the home/society. He felt that this stemmed from the mother being available and easy to interrupt, taking care of many small details with apparently no logical order, while the father usually has a room to himself (the den) and is often "out-of-bounds" ("Be quiet, your father is working, " etc.). [Torrance, 1960]

An interesting EAC Report by Lunneborg concluded that how a person defines a field affects its sex-appropriateness. For example, the "service" field was described as helping others (female definition) or subserviance (male definition), and the technical field was seen by females as belonging to an organizational structure, while males saw it as a personal accomplishment. [Lunneborg, 1979] Each group apparently has on differently tinted glasses!

Sex typing of tasks and its affect on achievement behavior had been studied by Stein, Pohly, and Mueller. They reported that males were more influenced by the sex-role typing of tasks, and that this may have been due to perceived parental and societal expectations to succeed. Their study also determined that as children mature they show an increasingly positive perception of the male role while building a negative feeling toward the female role. This would certainly reinforce sex-appropriate behavior in males while increasing conflict within the females. An androgynous female was observed to devote greater effort on a "male" task, which the researchers believed might be an attempt to seek a path towards greater status, acceptance, and probable success. [Stein, Pohly and Mueller, 1971]

Perceptions of job requirements, job sex-role stereotype, and sex-role identity proved a fertile research avenue. Burgoyne reported that in earlier studies (1909, 1943) it had been noted that occupational stereotypes were highly related to vocational choice. No recent studies have raised issue with this conclusion. Burgoyne's own study found that young people tended to attempt to follow their "ideal" self—the hope to attain--rather than the "real" self—can attain. [Burgoyne, 1979] Stein had noticed earlier that these attainment values were related to sex-role standards--e.g., males are more mechanical, females are more artistic. She then concluded that the standards appeared to be an antecedent for sex differences in later performance. [Stein, 1971]

Krefting and Berger tried to determine what made a job sex-appropriate. They discovered that the tasks which comprise the job (the building blocks) may not match the job in sex-appropriateness. Males appeared to be object oriented--males account for 98 percent of

the people in technical, trade, and industrial education programs--while females focused more on people--females account for 95 percent of the students in health-related subjects and 79 percent of those taking business courses (secretarial to managerial). [Krefting and Berger, 1979]

Continuing this line of research, Krefting, Berger, and Wallace investigated whether a job was sex-labelled by its content. They concluded that, even though males and females are attributed to have differing abilities and that this should determine job-type, labelling was more dependent upon who typically held the job. Therefore appropriate role models were part of the sex-typing in careers. [Krefting, Berger, and Wallace, 1978] This was later supported by Stockton, Berry, Shepson, and Utz when they evaluated how students selected a major. Males tended to stick to the male-dominated majors regardless of sex-role level as shown by using the BEM Sex Role Inventory. Female students demonstrated more complexity in the selection pattern. Generally androgynous individuals were more likely to choose non-traditional occupations. Unfortunately, data indicates that an increase in women in the field decreases both its prestige and desirability. [Stockton, et al., 1980] Could this be tied to previously mentioned assumptions that women do not <u>have</u> to work and if a woman can do the job it must not require too much skill?

CAREER SELECTION/COUNSELING

"Femininity is equally negatively related to both career commitment and career centeredness which suggest that self-attribution

of traditional feminine traits is debilitating even for 'sex-appropriate' career orientations such as long term career commitment." [Marshall and Wijting, 1980, p. 308,] How then, can women adjust to or select careers that best suit themselves, or can they?

Mezydlo and Betz studied the perceptions of real and ideal sex roles and concluded that both feminists and non-feminists, as rated on the BEM Sex Role Inventory defined the ideal male similarly, but disagreed on the definition of the ideal female. The feminists, both male and female, saw the ideal female as being more like the ideal male, an androgynous person. Yet traditionalism was still predominant in this female ideal self—i.e., the apparent preference toward masculinity was more the result of avoidance of certain female descriptors—ex. passivity, submissive. [Mezydlo and Betz, 1980]

Rossi tried to evaluate the barriers present that prevent or inhibit women from entering a degreed, professional field such as engineering. She identified three key factors were all inhibitors to career development: the traditional female role of "help-mate," the belief that a career should fill in gaps of time and energy left over after the primary role of wife-mother was accomplished, and the persistence in women to marry a man more intelligent, more capable than oneself. Many women avoided the science and math fields because these fields were seen as too demanding, incapable of being combined with a family, and lacking opportunities for part-time work which would have made it more possible to combine career and family interests. The academic and career fields also suffered due to lack of parental encouragement, perceived male resentment, and the fact that they were not defined as feminine. Female students therefore tended to conclude

that by entering these fields they would be punished socially or psychologically. [Rossi, 1965]

The idea of psychological barriers and success avoidance in female career selection had been earlier presented by Horner in a study on role conflicts. She felt that such barriers limited the effectiveness of any institutional "open door" policies and that women adjusted their behavior to this internalized sex-role stereotype, even when they were highly motivated. [Horner, 1972]

Karpicke reviewed recent literature on career development and selection and concluded that females still show more success avoidance and home-career anxiety than males, but that neither of these was the major influence on career choice. Apparently, the impact of prevalent career sex-role stereotypes and imbalanced career counseling were more detrimental than either of the above barriers. [Karpicke, 1980]

Additional insights into the factors related to job success and satisfaction were presented in another 1980 study that examined females in male dominated fields. [Greenfeld, Greiner, and Wood, 1980] The researchers found that these females were more educated and older than the "pink collar" workers (unskilled or semi-skilled jobs typically held by women), and discovered other important differences: 1) the "pink collar" force indicated that they were more satisfied with their job and saw their job as important--perhaps this was due to a lower expectation level or the fact that these jobs presented less role conflict; 2) the biggest difference was located in the definition of success. Those working in male-dominated fields defined success similar to the male (and societal) definition--high pay, authority, responsibility--whereas, the "pink collar" worker defined success by whether they were liked by

or helped others. Perhaps all the research on success avoidance or "fear of success" should be reexamined in light of this study.

Sex equity in careers has been studied by Thomas who found that females still primarily entered the fields of education and social science. [Thomas, 1980] This pattern had been noted by earlier researchers as well--Carnoy (1972), Persell (1977), and Willie (1978). These studies produced similar findings--sex differences in career aspiration and attainment were affected by the channeling and sorting practices of schools and other social institutions, as well as self-selection due to earlier internalized sex role standards presented by society.

Siegfreid reexamined sex differences in job preference and found that, regardless of major, it was possible to predict the sex of college students by knowing their job preference. According to this study, the more androgynous the female student was in her job preferences, the more likely her mother had a higher level of educational attainment. [Siegfried, et al, 1981] However, in another previously mentioned study by Greenfeld, Greiner, and Wood, it was found that this androgynous behavior was directly influenced to the father's educational level. [Greenfeld, Greiner, and Wood, 1980] It would appear that parental educational attainment is more important to female than male behavior.

Research to date has not focused on how women's career attitudes and choices are affected by career counseling programs. This avenue has not been widely studied and the studies done have been primarily reflective. A 1971 study by Thomas and Stewart noted the female counselors were more acceptant of a deviant goal issued by a client, but that a conforming client was viewed as more "OK" by both male and female counselors. [Thomas and Stewart, 1971]

Patterson suggested six reasons as to why counseling has such little impact on females--1) societal inculcation of the stereotyped feminine role, 2) lack of counselor awareness of society's changes on an internalized level, 3) provides for little interconnecting between sex role and vocational identity, 4) counselors typically used attributes easily codified rather than examine each client's life style, stage, or space, 5) many lacked sensitivity to or experience with discrimination, and 6) there was really only a minimum of contact time between client and counselor. [Patterson, 1973]

By 1980 Fox reported that counselors actually discouraged women from entering the fields of science and math, rather than encouraged. However, when counselors were surveyed directly they believed that they did not hold biased views regarding pursuit of technical careers, yet studies on adult women returning to college find that they are not actively encouraged to study mathematics or pursue technical careers. [Fox, 1980] Karpicke found that career counseling was not based upon empirical evidence but on stereotypical "shoulds," and that counselors stereotyped females more than males. [Karpicke, 1980] Counselors have not risen to the challenge as of yet and could provide women and men a major service once they have freed themselves of these stereotypes.

SUMMARY - CHAPTER 2

At this point the researcher has provided an overview of literature as it relates to women and the selection of science-based careers.

Science provides elementary school students with positive imagery, yet as the students progress through school, the courses become (or are perceived) more rigorous and less inviting, especially to females. This decrease in positive imagery appears related to previous and present exposure to academic science and related activities, a lack of achievement orientation, and negative teacher or peer encouragement.

When differences between the sexes were examined, it was noted that pre-puberty males and females show no learning advantages over each other. However, from puberty on males jump ahead in science and math interest, mastery, and aptitude. Many have shown that males have superior visual spatial skills--the basis of which may be biological or social appropriateness; yet, others firmly hold onto the conviction that the differences noted are based upon unequal participation in courses. The extent of math experience is shown to have a direct impact upon career selection, achievement, as well as student willingness to see math as an integral part of their future. Since math is frequently an entry skill for science careers, a perceived lack of math background or ability could restrict a student's interest or participation in science-related fields.

The impact of the acceptance of the traditional sex-role values affects student perception of their skills. Males perceive and are believed to be more scientifically/mathematically astute, whereas females excel (or are believed to) in the social skills. Success for males is predominately attributed to skill/worthiness, while for women success is seen as luck, not skill. Women are to fulfill their primary role (wife-mother) before moving to any other role--yet, women are more free than men to choose a second, less traditional role. Males seem to have a more rigid code of behavior, either self or society imposed.

How does the real/perceived role influence the level of self-confidence? Females show more anxiety regarding math/science courses than males. There is an inverse relationship between anxiety and participation. This relationship correlates highly (as does visual spatial acuity) with entrance into and success in academic science learning.

How does all this influence the career options seen as available to women? Women were noted to avoid careers that were viewed as too time consuming thereby conflicting with family, or fields that might cause social ostracism. Mezydlo and Betz note that the more androgynous a person, the less likely that individual is to be career-selection confined. Androgyny correlates positively with the attained educational level of the parents.

Success, typically defined in terms of financial gain, power, and responsibility, did not match the definition of success by women in one study. Success for them was measured by the ability to aid others.

The prevalence of appropriate sex-role models in a career, and the impact of bigoted career counseling deter both sexes from broadening their career-base.

All these findings help develop an understanding of the complexity in "free choice" of career selection.

Chapter 3

RESEARCH PROCEDURES

INTRODUCTION

The methodology used in order to test the hypothesis that as self-confidence and an androgynous sex-role identity increase so does the likelihood of a scientific career will be expounded upon in this chapter. The format followed to gather and interpret the data includes the following progression: 1) type of study, 2) research population, 3) research model, 4) research instruments, 5) data collection procedure, and 6) statistical analyses.

TYPE OF STUDY

The purpose of this study was to assess how self-confidence and sex-role identity affect perception of science as a career among adult women. C. M. Brody reported that sex-typing was one of the most important factors in the governance of behavioral development motivation and self-concept. The presence of sexism increases the limits of one's opportunities for personal growth and a healthy adult performance. [Pugliese, 1977]

In a special report to the Ford Foundation, Fox commented on the low number of women in the math and science-related fields. Deciding not to study science can be seen as both cause and effect in the previously mentioned cycle of reinforcing stereotypes and behaviors.

Three possible directions for future research in this complex and inadequately studied area were proposed by Fox. They are

1) classroom studies (especially on the remedial and/or intervention programs) to help discover how social factors discourage women from entering science fields

2) descriptive longitudinal studies and observations of females in schools and at home in order to comprehend how these social factors promote or inhibit achievement

3) case studies of those students who are science oriented in order to find out what "happened" to them that shaped their attitudes and behaviors. [Fox, 1980]

Fennema addressed the Equity in Mathematics Conference and reviewed two well evaluated intervention programs that were helping to increase female willingness and interest in pursuing science and math instruction. Both programs have met with apparent successes--increasing participant awareness of the importance of science/math courses, increasing knowledge regarding scientific and technical fields, and increasing plans among the participants to take more than two years of high school math. [Fennema, 1982]

In an effort to understand which factors affect career selection comparative research techniques were utilized in order to further explore and analyze two identified factors--sex-role identity and self-confidence. Comparisons were made among women on the basis of their sex-role identity, self-confidence, and career preference and/or selection to determine how these factors interacted to influence their career decisions.

RESEARCH POPULATION

The population selected consisted of females aged 30 years or older who were returning to a formal learning environment after a

learning hiatus of five or more years. This population was further reduced by only examining those women entering a community college.

The rationale for limiting the population as described above was based upon the following assumptions:

1) Women over 30 years of age would have passed through most of their formative growth and development prior to the advent of the women's movement.

2) These women would have resolved most of their youthful identity crises.

3) The women would more likely be returning to the learning environment for a defined career goal. [Cross, 1974]

4) The community college has typically been viewed as the home of the non-traditional student; therefore, it would be accessible to a diverse student population (i.e. age, ability, preparedness). [Cross, 1974]

RESEARCH MODEL

In preparing a research model the population was subdivided according to each respondent's self-perception on a sex-role scale, as determined by the Bem Sex Role Inventory (BSRI). Four groups were identified: undifferentiated, masculine, feminine, and androgynous. These categories were then correlated with each respondent's level of self-confidence as defined by Harrison Gough's Adjective Checklist (ACL). The resulting cells were systematically matched with career preferences as indicated via the COPSystem Interest Inventory.

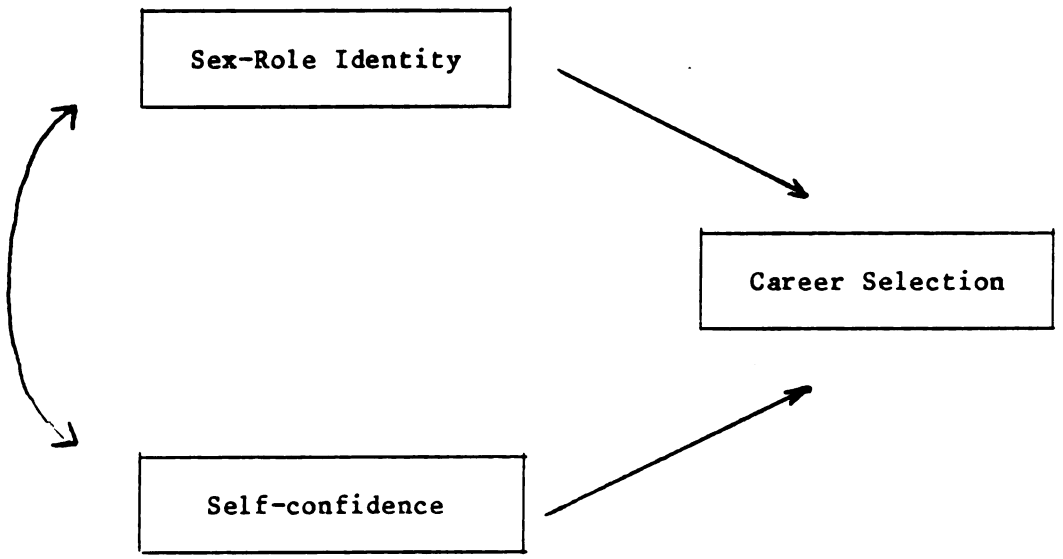


Figure 3.1. Correlation model

The model (Figure 3.1.) hypothesized a correlational pattern between the two independent variables--sex-role identity and self-confidence and career selection. This research focused primarily upon the relationship of the combined effect of the independent variables (sex-role identity and self-confidence) upon career selection. This research model enabled the examination of this focal point.

RESEARCH INSTRUMENTS

The study utilized three independent measures frequently found in the study of women's issues. The selection was based upon the researcher's intention to get a more complete picture of the human dynamics involved with sex-role identity, self-confidence, and the resulting career selection.

The instrument chosen for sex role identification was the BEM Sex-Role Inventory. This self-rating scale, developed by Sandra L. Bem in 1974, measured psychological androgyny.

Bem's subsequent findings were 1) male and female characteristics are empirically independent; 2) sex-typed scores are based upon an individual's perception of desirable behaviors rather than upon societal stereotypes; and, 3) the legitimacy of psychological androgyny.

The terms used as items in the inventory describe traits based upon internalized sex-typed standards, not on the basis of differential endorsement by males and females. For example--the androgyny score does not measure a tendency to respond in a socially desirable manner, as it has a near zero correlation with the social desirability scale. [Bem, 1974]

Each individual was then labeled as a function of the difference between the male and female scores. This method, recommended by Strahan (1975), yielded results ($r=.98$) that correlate with the results obtained via the more complicated method suggested by Bem. As an example, if the individual has a high similarity with feminine traits, and a low similarity to masculine traits, the individual was scored as feminine. However, if the person scored a low difference between self and the masculine or feminine traits, the respondent was defined as androgynous.

Bem used the t-score because she believed it allowed her to ask whether maleness or femaleness differed significantly, while also providing a method for categorizing and comparing sex-types between different populations.

Test-retest reliability for this instrument was measured over a four-week interval, via the Pearson Product Moment correlation, with the following results:

masculinity	r = .90
femininity	r = .90
androgyny	r = .93
social desirability	r = .89 [Bem, 1974]

Validity, checked by examining four groups of college students, males (N = 444 and 117) and females (N = 279 and 77), showed that males scored significantly higher on masculinity ($x = 4.97$ and 4.96) than females ($x = 4.57$ and 4.55) at $p < .001$. These same females scored $x = 5.01$ and 5.08, while males scored $x = 4.44$ and 4.62 on the femininity scale. [Bem, 1974]

In trying to locate a research instrument for measuring self-confidence, this researcher was made acutely aware of the difficulty in finding a tool that was capable of its assignment, yet was easily manageable for both researcher and respondent. After reviewing Buro's Mental Measurement Yearbook as well as soliciting the opinions of a variety of experienced professionals in the field, the Adjective Check List (A.C.L.) by Harrison Gough and Alfred B. Heilbrun, Jr. was selected as the appropriate measure to use.

The development of the ACL started in 1949 with R. B. Cattell's designation of 171 trait characteristics on personality structure (1946). Using factor analysis, Cattell's work had produced 12 major traits of personality. Gough and Heilbrun selected 125 adjectives from Cattell using the theoretical viewpoints of Freud, Jund, and others to

determine which terms to add or delete. By 1951, they had arrived at over 280 adjectives. Finally in 1952, with further modifications, the ACL was published with 300 items, the same total currently used.

In 1980, because of earlier criticism, the ACL developed normative data using N = 10,000, while the manual provided interpretations for eight sample profiles. The normative samples were arbitrary in composition, therefore a general population trend may not be sufficiently represented. However, the samples were diversified educationally, socially, intellectually, and chronologically. The use of adjectives and scales has proven useful in reducing subjective interview judgments, therefore producing statistically manageable events. Additionally the ACL was capable of being effectively utilized in measuring self-confidence without scoring for the entire set of adjectives. This made it extremely attractive for this research study.

The ACL has also been utilized in studies of stereotypes. Hollander and Parker (1969, 1972) and Ziegler (1973) used the ACL to find out how a respondent's description of self and a chosen occupation correlated. They discovered that persons moving toward a career usually provided favorable stereotypic protraits of that occupation as well as a significant similarity between self and career.

The ACL made use of the Q-sort technique which allowed one to interpret the results of an individual via the salience and patterning of their attributes, not by comparison to another subject. The list of terms stemmed from descriptions used in everyday life; therefore, the selecting task is non-technical (requiring no special knowledge base) and the comprehensiveness of the ACL's 300 items (if all were used) was

sufficient to ferret out any subtle nuances that might otherwise be overlooked.

Due to differences among subjects and their willingness to make comments (select items), the ACL used as a "free" variable, the number of items checked--the respondent was encouraged to check as many or as few words as they desire (most--80%--check between 50 and 150 items). [Gough, 1980]

In the Seventh Mental Measurements Yearbook, Leonard G. Rorer criticized the instrument because it was difficult to distinguish if the respondent was answering according to who they are versus who they would like to be! This is an apparent problem that personality profiles consistently face, but then it seems to be somewhat characteristic of humans to present (or at least try to) their best or "favorite" side.

In order to measure career preference, the COPSystem developed by the Educational and Industrial Testing Service (EdITS) was selected. This interest inventory was designed to aid the individual in comparing relative strengths and weaknesses of interests in relation to those tasks performed in a variety of occupations.

A major advantage in using this particular instrument was that it did not employ a "forced-choice" format. COPS provided the individual with the freedom to choose the degree to which one liked or disliked a given choice. Another positive step in the design of this instrument was the item, each was activity oriented rather than employing the standard format occupational titles. The standard approach posed problems because the respondent was often unaware of either the occupation or what the occupation entailed.

COPS was not an instrument geared for the professional or college-oriented person as is the Strong Vocational Interest Blank.

This attribute was a factor in its selection, since it enabled one to identify occupational goals that may reasonably be achieved via a variety of levels in academic experience.

How did COPS relate to the selection of a college major? According to EdITS, analysis demonstrated that choice of major was related to, and therefore predictive of, the measured occupational cluster. In Science (Professional and Skilled) the following results were tabulated. [COPSystem, 1976]

	N of Subjects in Interest Cluster	Total Number in Cluster	Chi Square
Science			
Professional	31	38	81.6
Skilled	6	6	22.0

When the three highest interest groups were examined, 71 percent of the students matched their declared major to the cluster, while 92 percent had interest scores of 50 percent or better within the cluster as determined by their declared major.

COPS was tested for concurrent validity in 1976 by Savage, using correlations with Holland's Vocational Preference Inventory and the Kuder General Interest Inventory. A sample of 57 adult females was utilized in the study. A correlation of .70 was found with VPI and COPS on professional science and investigative while Kuder's scientific and COPS science, professional had a correlation of .57. The highest correlations were obtained between similarly named scales. "Since these other instruments do not distinguish between professional and skilled level occupational clusters, patterns of correlations vary . . . . the magnitude of correlation is greatly different against professional as compared with the skilled level cluster." [COPSystem, 1976]

COPS was further tested for validity by administering it to community college students. Even with small subsample sizes, it was discovered that there was again a high correlation between a person's elected occupation and the three highest interest clusters on the COPS inventory.

The use of separate sex norms was an attempt by EdITS to eliminate bias by yielding an equal number of individuals within each cluster. This way each respondent was equally exposed to all of the clusters and all the occupations listed for that cluster.

Bodden in Buros' Seventh Mental Measurement Yearbook felt that this caution should be noted in the use of COPS: ". . . (It) is an example of homogeneous keying. . . high scale scores do not always correspond to the interests of persons actually working in the 'expected' occupation." However, most of his complaint(s) were based upon a lack of data which EdITS has worked diligently to rectify since this critique.

In attempting to develop a reasonable survey format for the utilization of the three instruments previously discussed, it was determined that using all three of these research tools as they were originally designed would significantly lower the number of respondents in the sample population. In order to prevent this, but still maintain the model it was decided that some test modifications would be required.

The Bem Sex-Role Inventory was established with sufficient brevity that it was determined usable in its entirety.

The Adjective Checklist was a list of 300 terms--far too inhibiting for the potential respondent to do along with the other two

formats. However, it was possible to remove those adjectives that constituted the self-confidence scale. The appropriate terms for self-confidence, along with an additional twenty-three nonsensical descriptors (a dummy variable) from another ACL scale (Creative Personality) should suffice to identify subgroups in the model population that would be labeled accurately.

COPS was similar to the ACL in length, so only those descriptors that pointed out career proclivities in the sciences (both professional and skilled) as well as technology were utilized.

Since two of the instruments had been modified in order to reduce their time and complexity, so as to increase participant response, it was necessary to do a factor analysis of each one. In order to make certain that only self-confidence was in fact being measured, a factor analysis was performed on the modified ACL questionnaire to extract the dummy variable (creativeness). The same factoring method was employed to analyze the modified COPS to produce separate factor scores for science and technological careers. In this manner, both forms were checked to ensure that the traits being assessed were only those pertinent to the research hypotheses.

The adjusted ACL factor score and the BSRI score, were then examined separately to determine the effect of each individual variable (i.e., sex-role identity, self-confidence) on career selection.

The next step in the treatment of data was the use of multiple regression in order to look at the combined effect of self-confidence and sex-role identity upon career selection. This statistical technique was consistent with the model presented in Figure 3.1., which was designed to test the hypothesis that the combined effect of both

independent variables would be a better predictor of career selection than either facit individually.

DATA COLLECTION

A pilot group (comparable to the study population) pretested the questionnaire survey. This group came from students involved in a special "returning-to-college" forum at Tidewater Community college. The forum had been specially designed for meeting the needs of these women. The pilot was run so that the survey could be assessed regarding the following areas:

1) was the format clearly presented;

2) were the directions easy to follow;

3) how long would the survey take an average respondent to complete?

Each person was requested to circle any question/directions that appeared vague or were difficult to interpret. Subsequent modifications in the instruments' format and items were then completed.

Help in identifying and reaching the research population previously specified was received from the staff of Tidewater Community College. All female adult learners--30 years or older who had returned to a formal learning environment after at least a five-year learning hiatus--were selected from the total student population currently enrolled at Tidewater Community College.

Once the potential respondents were identified (N=595), the questionnaire, a self-addressed, stamped envelope, and an introductory letter describing the project was mailed to each potential participant. The letter described the project and its support from the

college, and explained the need for their participation, and indicated that a summary of the findings would be made available, if desired.

The tests were not timed, therefore each person was able to work according to their own schedule. The instrument sequence was the BSRI, then the modified ACL, concluding with the reduced COPS. The entire time to complete the form had been significantly reduced by adjusting the instruments. This was an important consideration, since this population typically experiences time constraints on many fronts.

Within two weeks of receiving the testing material the respondent had either a) completed and returned the packet or b) was sent an entire survey with a letter of the importance of her response. Any respondent who had not yet returned the survey by the end of a month was sent a third, and final, set of survey forms.

METHODOLOGICAL LIMITATIONS

Out of the sample (N=595), 341 surveys were returned with twenty-three of them being blank. Therefore 318 usable surveys out of potentially 595 produced a return rate of 53 percent.

As the survey responses were being transferred to a computer disk file for tabulation, it was discovered that three questions on the career selection instrument (Part C) had been inadvertently duplicated. In addition one of the activities listed did not include boxes for respondents to mark. (See Appendix A) The question without check-off boxes (#341) and the question following it (#342) were eliminated from the data, because it was not possible to ascertain whether either activity had been inadvertently unscored or mis-scored—some individuals

left #341 blank and answered #342, while others inserted boxes into #341 and scored #342.

A frequency count was run to check the consistency of scores between those questions that had been unintentionally duplicated. The results are shown in Table 3.1. Since there were slight differences, it was decided that the first set of questions would be retained. It was felt that the initial response would more accurately reflect the actual choice.

Some of the respondents had left unanswered one or more questions on Part A - Personality Inventory. Since the scoring procedure for this inventory required that all items be marked, any individuals who had not completed Part A totally were eliminated from future analysis involving this section.

After taking into consideration these format problems, the usable questionnaires equaled 263 for this study. Therefore the functional return rate was determined to now be 44 percent. This drop of 9 percent presented some limitations in having sufficient numbers of individuals in each cell for the statistical treatments that were employed. The various adjustments that were required in cut-off scores for the establishment of categories for Chi-square and multiple regression tests may have influenced the probability levels of the findings.

A further limitation involved the alteration of the career selection instrument (Part C)--shortening its overall length so as to make the total survey less time-consuming for respondents to complete. This had been accomplished by eliminating slightly more than one-half

	INITIAL ITEM		DUPLICATED ITEM	
	SURGEOPER			
Answer	Frequency	Percent	Frequency	Percent
0	2	0.760	6	2.281
1	41	15.589	48	18.251
2	49	18.631	39	14.829
3	51	19.392	49	18.631
4	120	45.627	121	46.008
	DESIGNAPPLIAN			
0	1	0.380	5	1.901
1	43	16.350	27	10.266
2	47	17.871	56	21.293
3	77	29.278	75	28.517
4	85	36.122	100	38.023
	TESTBLOOD			
0	1	0.380	8	3.042
1	41	15.589	37	14.068
2	70	26.616	55	20.913
3	65	24.715	71	26.996
4	86	32.700	92	34.981

Table 3.1. Frequency counts for duplicated items in Career Interest Inventory

(54%) of the selections which were non-science and non-technically oriented.

STATISTICAL ANALYSIS

The independent variable, self-confidence, was scrutinized via a modified version of Gough's Adjective Checklist (permission granted by Consulting Psychologists Press, Incorporated). In order to assure self-confidence was in fact being investigated in this abridged version, a factor analysis was conducted. Analyzing the ACL in this manner would indicate that the instrument used was valid for self-confidence determination.

Since the BEM Sex-Role Inventory was not adjusted, a raw generalized score was gathered according to the standard format outlined by Bem. [Bem, 1974] The following clusters rendered were feminine, masculine, androgynous, and undifferentiated.

This completed the evaluation of the two independent variables. Subsequently COPSystem Inventory was computed in order to evaluate whether the respondent evinced a predilection for a science-based career. If she did, it was scored as an affirmative inclination toward a science métier.

Multiple regression was utilized in order to discern the overall impact of self-confidence and sex-role identity upon career selection, and to ascertain the predictive ability of both independent variables upon career choice.

The following cells were produced.

Dependent / Independent	Science Career Choice	Technological Career Choice
Androgynous, High Self-Confidence		
Androgynous, Low Self-Confidence		
Masculine, High Self-Confidence		
Masculine, Low Self-Confidence		
Feminine, High Self-Confidence		
Feminine, Low Self-Confidence		
Undifferentiated High Self-Confidence		
Undifferentiated Low Self-Confidence		

Table 3.2. Potential Cells Produced

Correlation coefficients were calculated to find out if sex-role identity or self-confidence would have been equally sufficient predictors. A Chi-square was done in order to confirm and strengthen the interpretation of the multiple regression. Three Chi-squares were conducted in order to measure the following relationships: sex-role to career, self-confidence to career, and sex-role plus self-confidence to career.

Chapter 4

DISCUSSION OF RESEARCH

INTRODUCTION

The purpose of this research was to examine the role of self-confidence and sex-role identity in a woman's selection of potential careers. In the research of literature as presented in Chapter 3, two variables--sex-role identity and self-confidence--were mentioned as being limitors in accessing scientific and technical fields by women. This research used two variables (self-confidence and sex-role identity) as predictors of career selection, which served as the criterion variable.

Therefore, three hypotheses were generated:

1) As a woman's level of self-confidence increases, so does the probability that she will select a science-based career.

2) An androgynous sex-role identity in a woman is positively related to the choice of a career in science.

3) If a woman is both androgynous and high in self-confidence, there is an even greater likelihood that she will select a science-based career.

In setting up the research design for this study, the choice of which statistical treatments to employ was based upon the following criteria relevant to the testing of the hypotheses. Multiple regression

was used in order to determine the degree of relationship between the independent or predictor variables and the dependent or criterion variable. The use of this method of analyzing the data enabled a prediction rating to be established for the criterion variable by knowing the participant's predictor scores. Since one of the goals of this research was to be able to identify a potential science-oriented person by knowing their sex-role identity and level of self-confidence, the production of a coefficient (R-square) would provide the necessary data base to either reject or accept the hypothesis.

RESULTS

A pilot study was run in order to check the average length of time required for a person to complete the questionnaire, and to unravel any difficulties with the directions or format of the instrument. The people chosen were participating in a special "returning-to-college" seminar especially designed for mature women who were newly enrolled at Tidewater Community College. The findings from the pilot study indicated that 1) the average time to complete the survey instrument was approximately twenty minutes, 2) the print on the questionnaire was too small, 3) the BEM Inventory (Part A) had too many response choices for each item; and, 4) the Career Selection (Part C) forced them to make a choice (i.e., there was no "undecided" response available), which some did not like. (See Appendix A)

Based upon the feedback obtained from the pilot study, the following adjustments were made in the instrument and methodology. The respondent's completion time fell within the anticipated limits and was therefore left unchanged. To improve the questionnaire's readability, the print was subsequently enlarged (see Appendix A). This made the

survey four pages rather than three pages. The Personality Inventory (Part A) was retained as originally designed, since the total number of choices for each item was an important aspect of the survey design. The forcing of a definitive response in the Career Selection instrument (Part C) was also essential in the production of the data necessary for analysis; so that feature was also retained.

In order to establish the Sex-Role (Part A) scores for each participant, all the masculine variables and those that were feminine (as previously determined by Bem) were added separately to derive masculine and feminine totals. Each participant's responses were then scored to produce their masculine (MASTOT) and feminine (FEMTOT) totals. (See Appendix B for sample) Following this data summary, a univariate procedure was employed to establish and validate the cut-off points for determining whether a person was classified as masculine, feminine, androgynous, or undifferentiated. (See Table 4.1.) The mean for the masculine score in this survey was 4.74 (normative date for the BEM instrument was set at 4.55-4.57), while the feminine score was 5.25 (normative data was set at 5.01-5.08). These scores were obtained by dividing the score in Table 4.1. by 20, the number of items in each category. Respondents were distributed into four sex-role categories as displayed in Table 4.2.

Sex Role Category	N = number of individuals
Androgynous	76
Feminine	59
Masculine	61
Undifferentiated	67
	263 = N total

Table 4.2. Number of Respondents in each Sex-Role Category.

	FEMTOT	MASTOT
MOMENTS		
N	263	263
MEAN	105.038	94.9658
STD DEV	10.4391	15.5038
SKEWNESS	-0.559762	-0.314311
USS	2930227	2434842
CV	9.93844	16.3257
T:MEAN=0	163.177	99.3358
NUM^=0	263	263
SUM WGTS	263	263
SUM	27625	24976
VARIANCE	108.976	240.369
KURTOSIS	0.732439	0.0092127
CSS	28551.6	62976.7
STD MEAN	0.643705	0.956008
PROB>/T/	0.0001	0.0001
PROB>/S/	0.0001	0.0001
QUANTILES (DEF=4)		
100% MAX	127	130
75% Q3	112	107
50% MED	106	94
25% Q1	99	85
0% MIN	62	38
RANGE	65	92
Q3-Q1	13	22
MODE	108	103

Table 4.1. Univariate statistics on Bem Sex-Role Inventory (Part A)

Based on the balanced numbers of respondents assigned to each grouping and the MASTOT and FEMTOT scores approximating the normative data, this researcher determined that the Bem Sex-Role Inventory (Part A) would serve as an effective vehicle for accurately reflecting the sex-role identities of the respondents. The statistical treatments applied in the remainder of the study used only the androgynous and feminine groups, since these were the focus population in this research project.

The Self-Perception instrument (Part B) was chosen to measure self-confidence. This instrument was a subset in Gough's Adjective Checklist. The method used to acquire the self-confidence score took the total number of positive adjectives checked by the participant and then subtracted the total of negative adjectives checked. This net score was then compared to Gough's Adjective Checklist self-confidence score. The numerical minimum for measuring positive self-confidence according to both was +11. A respondent with a score of less than +11 was subsequently defined as having a negative self-confidence rating. (See Table 4.3.)

Gough's Adjective Checklist contained 37 scales, but only two scales were selected for use in this study--self-confidence and creative personality in order to keep time on task to a minimum. Two scales were used instead of one to avoid participant awareness of, and perhaps bias towards, what was exactly being assessed. A factor analysis was performed in order to find out if there were individual correlations among the positive and negative adjectives. Table 4.4. indicates that there is in fact a factor pattern which validates these groups' distinct

FREQUENCY

SELF	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
NEGAT	146	146	55.513	55.513
POSIT	117	263	44.487	100.000

UNIVARIATE (VARIABLE SCFDTOT)

MOMENTS		QUANTILES (DEF = 4)	
N	263	100% MAX	20
MEAN	10.5057	75% Q3	15
STD DEV	5.48062	50% MED	11
SKEWNESS	-0.645287	25% Q1	7
USS	36897	0% MIN	-13
CV	52.168		
T:MEAN=0	31.0866	RANGE	33
NUM^=0	257	Q3-Q1	8
SUM WGTS	263	MODE	11
SUM	2763		
VARIANCE	30.0372		
KURTOSIS	0.702137		
CSS	7869.74		
STD MEAN	0.337949		
PROB>/T/	0.0001		
PROB>/S/	0.0001		

Table 4.3. Univariate statistics and frequency count for Self-confidence Inventory (Part B)

FACTOR PATTERN		
FACTOR 1	FACTOR 2	
0.61219	-0.16940	SELFCONFIDENT
0.58486	0.06875	ORIGINAL
0.55375	-0.00252	ASSERTIVE
0.54935	-0.13617	CONFIDENT
0.54553	0.12106	INDIVIDUALISTIC
0.53904	0.10952	ENTERPRISING
0.53313	0.05586	CLEARTHINK
0.52491	0.12370	STRONG
0.52347	0.06004	ENTHUSIASTIC
0.52204	0.07008	RESOURCEFUL
0.51291	0.16327	COURAGEOUS
0.50445	0.13894	SHARPWIT
0.50219	0.11195	CLEVER
0.49466	0.07729	DETERMINED
0.47518	-0.05881	ENERGETIC
0.47209	-0.20234	WIDEINTERESTS
0.47012	0.06338	INVENTIVE
0.46918	0.04634	SEXY
0.46796	0.04630	INTELLIGENT
0.45679	-0.06599	SOCIABLE
0.45112	0.12331	HUMOROUS
0.45036	0.07278	AMBITIOUS
0.43220	0.06412	OUTSPOKEN
0.39471	0.01721	GOODLOOKING
0.38711	0.15392	CAPABLE
0.38668	0.23496	INSIGHTFUL
0.35017	-0.11028	ACTIVE
0.32486	0.01971	HEALTHY
0.27823	0.18970	UNCONVENTIONAL
0.21299	0.20232	REFLECTIVE
0.20030	0.04305	SINCERE
0.16193	0.08897	HONEST
-0.16235	0.60609	WITHDRAWN
-0.01339	0.54984	WEAK
-0.00519	0.54301	SUSPICIOUS
-0.29205	0.53421	DULL
-0.13442	0.51852	COMMONPLACE
-0.10421	0.48549	MEEK
-0.11234	0.47767	SILENT
-0.01374	0.45902	ARTIFICIAL
-0.17520	0.44700	DISSATISFIED
-0.09228	0.44061	NAGGING
-0.08788	0.44035	LAZY
-0.04751	0.43971	SUBMISSIVE
-0.09859	0.42276	HOSTILE
0.07017	0.40283	SELFISH
-0.14420	0.39435	QUIET
-0.03121	0.38744	CONSERVATIVE
-0.03681	0.38661	RESERVED
-0.35305	0.37862	NARROWINTERESTS
0.14624	0.35153	CONVENTIONAL
0.15284	0.32989	EGOTISTICAL
-0.01986	0.32375	CAUTIOUS
0.07499	0.30985	INFORMAL
0.06341	0.30555	SNOBBISH
0.18627	0.21299	MANNERLY

Table 4.4. Factor pattern for Self-confidence items

uniqueness. Since the mean confidence score in the study was +10.5 with a median of +11 (which matched the normative data), and the factor analysis had shown that the abbreviated instrument was able to distinguish between two populations (positive and negative self-confidence), Self-Perception (Part B) was assumed to be an accurate and adequate delineator of an individual's level of self-confidence. The choice of using dichotomous-based data was to allow for more meaningful grouping of the data to facilitate analysis and interpretation.

The third instrument in this study was the COPSystem Interest Inventory (Part C) which was used to measure the dependent variable, career selection. The inventory was extremely long in its original format and had been abbreviated by eliminating approximately one-half of its list of activities. All activities under the headings of science or technology (professional and skilled) were retained, the remaining activities fit under business, clerical, art, service, and communication domains.

As in the case of the Adjective Checklist, a factor analysis was done in order to determine if the instrument, as modified for this study, successfully grouped areas of career interest. The factor pattern produced, as shown in Table 4.5., did not show a strong separation of careers. However, one was able to determine that the science and technical careers were primarily retained by the first factor and were grouped above a 0.40 correlation.

Factor scores for each respondent were generated from the standardized scoring coefficients of science and technical activities above a 0.40 correlation. Through a univariate procedure factor scores were categorized into low, medium, and high science interest (see Table 4.6.) These interest categories were analyzed along with the

STANDARDIZED SCORING COEFFICIENTS

FACTOR 1	FACTOR 2	
0.01370	0.07114	ACT
0.01518	0.05602	COUNSEL
0.02227	-0.06005	INSTALLWIRING
0.02668	-0.03937	TAKEFINGERPRIN
0.02352	-0.04515	REPAIRAUTOS
0.02776	-0.00071	RESEARCHVITAM
0.02349	0.05124	DESIGNFURNIT
0.02615	0.05190	CHARGEVOCED
0.02208	0.07197	COLORILLUST
0.02575	0.06695	CONDUCTYOUTH
0.02511	0.01052	STUDYROCK
0.03127	0.02945	DESIGNBLDG
0.02632	-0.06092	CLEANTTUBE
0.02598	-0.05291	REPAIRAPPLIANC
0.01699	-0.06147	TYPELETTER
0.01921	0.06107	PLAYMUSIC
0.02846	0.03009	TEACHRECREAT
0.02417	-0.06876	SORTMAIL
0.04166	-0.00600	DEVELOPPROCESS
0.03536	-0.06210	MAKEDENTAL
0.03479	-0.04262	CUTWOOD
0.03618	-0.06196	TAKEMEASUPILLS
0.01453	-0.04835	BANKSTATEMNET
0.02559	0.04373	EDITNEWS
0.02176	-0.00641	COOKFOOD
0.02394	-0.00941	SURGOPERAT
0.03893	0.01380	DESIGNKITCAPPL
0.03066	-0.06815	TESTBLOOD
0.02634	0.06534	TALKPOLITICIAN
0.02470	0.01112	SELLNEWPROD
0.03570	-0.01768	APPLYRATESINSUR
0.03626	-0.03858	APPLYROOF
0.04411	-0.04813	FINDDEFECTS
0.03374	-0.05940	OPERATEMACHI
0.03657	-0.04783	HELPDENTIST
0.02757	-0.02503	USESMALLTOOL
0.03430	-0.00478	SELLAUTOS
0.02559	0.09768	WRITESHORTSTORIES
0.02421	0.07425	DECORATEWINDOW
0.03408	0.00687	RETOUCHPHOTOS
0.02044	0.06253	GUIDEPEOPLE
0.03223	-0.00430	CHEMEFFECTS
0.03542	-0.02226	DESIGNELECTPARTS
0.02893	0.03826	STUDYSUN
0.02814	0.05713	MAKEPAINTING

Table 4.5. Standardized Scoring Coefficients for Career Inventory (Part C)

STANDARDIZED SCORING COEFFICIENTS

FACTOR 1	FACTOR 2	
0.02617	0.05765	LEADYOUTH
0.02288	0.06619	EDIT
0.03105	0.00937	DEVELOPRINTPHOTO
0.02022	-0.04083	CATALOGBOOKS
0.01982	0.06067	ARRANGESTAGESET
0.03142	-0.05730	SPRAYCHEMICALS
0.02955	-0.03177	APPLYPLASTER
0.02511	-0.07385	MEDTESTS
0.02792	-0.06074	REPAIRPIPES
0.02537	0.05162	ADVISEPEOPLE
0.03726	-0.03017	TAKEREADINGS
0.03770	0.03198	NEWENERGY
0.02576	0.09295	WRITENEWSART
0.02064	0.04204	ARRANGEFLOWERS
0.03560	0.02270	LEARNOCEAN
0.03543	0.02018	DESIGNTRAFFICEXIT
0.03026	0.01161	STUDYDISEASES
0.03318	0.03012	PLOTCOURSE
0.02941	0.01089	SELLINSURANCE
0.03492	0.04795	DESIGNSPACE
0.03270	-0.01176	CANCERRESEARCH
0.04392	0.00087	MAKENYLONCLOTH
0.03136	-0.00984	SOLVEMATH
0.03923	0.02369	CONSTRUCTBRIDG
0.02445	-0.00515	MANAGEACCOUNT
0.02181	-0.03172	BANKTELLER
0.02795	-0.01130	PREPAREMEALS
0.02221	-0.01703	SEWFABRIC
0.01439	-0.07503	RECORDORDERS
0.02343	0.02015	SELLHOUSES

TABLE 4.5. (continued)

FREQUENCY

CAREER	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
HIGHSCI	66	66	25.095	25.095
LOWSCI	65	131	24.715	49.810
MEDSCI	132	263	50.190	100.000

UNIVARIATE (VARIABLE=FACTOR 1)

MOMENTS		QUANTILES (DEF = 4)	
N	263	100% MAX	1.00628
MEAN	1.329E-16	75% Q3	0.442994
STD DEV	0.601487	50% MED	0.0266834
SKEWNESS	-0.902153	25% Q1	-0.37344
USS	94.7882	0% MIN	-3.26227
CV	4.527E+17		
T:MEAN=0	3.582E-15	RANGE	4.26855
NUM^=0	263	Q3-Q1	0.816434
SUM WGTS	263	MODE	1.00628
SUM	3.494E-14		
VARIANCE	0.361787		
KURTOSIS	2.40552		
CSS	94.7882		
STD MEAN	0.0370893		
PROB>/T/	1		
PROB>/S/	0.441424		

Table 4.6. Univariate statistics and frequency count on Career Inventory items (Part C)

independent categorical data: sex-role (feminine versus androgynous) and self-confidence (positive versus negative). The analysis of the above data was accomplished through the Statistical Analysis System (S.A.S.) Institute's General Linear Model (G.L.M.) and the output may be found in Table 4.7. Multiple regression was selected because the research was focusing upon the ability to predict a criterion variable (career selection). Multiple regression combines the predictive values of several measures (e.g., sex-role, self-confidence) into a single formula that weights each variable according to its predictive ability. The degree of correlation between the criterion and predictor variables is the coefficient R. As these data demonstrate, there was limited interaction between the independent and dependent variables, however an F of 1.21 with a p of 0.3072 is not regarded as statistically significant. Since R^2 (R-square) measures the amount of variation in the dependent variable that can be explained by the model--it was evident that an $R^2 = 0.027$ did not account for sufficient variation to make the model reliable as a predictive tool.

However, further analysis through Type I and Type III testing revealed a partial correlation coefficient that indicated self-confidence was the stronger predictor of career choice (with an F score of 3.16 and a $p < 0.078$). Type I analysis demonstrated (through the sequential sums of squares [SS]) the amount of error improvement as each effect was added. The results verified that most of the prediction was due to self-confidence. The Type III SS, partial sums of squares, indicated the reduction of error for each effect separately. Again, self-confidence appeared to be the better predictor.

DEPENDENT VARIABLE: FACTOR 1

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR>F	R-SQUARE	C.V.
MODEL	3	1.27759061	0.42586354	1.21	0.3072	0.027039	4847.0960
ERROR	131	45.97290132	0.35093818				
					ROOT MSE	FACTOR 1 MEAN	
CORRECTED TOTAL	134	47.25049192			0.59240035	-0.01222176	

SOURCE	DF	TYPE I SS	F VALUE	PR>F	DF	TYPE III SS	F VALUE	PR>F
SEXROLE	1	0.16809393	0.48	0.4901	1	0.79637228	2.27	0.1344
SELF	1	1.10938793	3.16	0.0777	1	1.10943718	3.16	0.0777
SEXROLE * SELF	1	0.00010874	0.00	0.9860	1	0.00010874	0.00	0.9860

Table 4.7. General Linear Model for research study

Since the G.L.M. had not produced statistically significant results, a Chi-square analysis was generated. The Chi-square is a non-parametric statistical tool, easily used when the data are in the form of frequency counts. Since all the data had been placed in categories through frequency counts in the quartiles produced in the univariate procedure, this statistical test was selected as an alternative analysis pattern. It was hoped than any hidden relationships may be enhanced via the X^2 and/or Phi coefficient. This was done because the literature was so definitive on the inter-relationship of the two predictor variables themselves, as well as with the criterion variable, and yet, the G.L.M. model, Type I and Type III SS had not produced the anticipated outcomes.

The first Chi-square run was between sex-role and self-confidence. The findings derived from this analysis are displayed in Table 4.8., which indicates a high degree of interaction between the two variables. This data is consistent with previous research suggesting that androgynous women have more positive self-confidence levels.

Additional sets of Chi-squares were run to examine the relationship between self-confidence and career choice as well as sex-role identity with career choice. The results are displayed in Tables 4.9. and 4.10. In each case, the data do not support the probability that the groups were significantly different from what would be expected through random chance so career choice has statistically insufficient impact from levels of self-confidence or sex-role identity.

Since the research literature had indicated there was a positive relationship between the two independent variables, and the Chi-square

TABLE OF SEXROLE BY SELF

SEXROLE			
FREQUENCY/ DEVIATION/ ROW PCT/	NEGAT	POSIT	TOTAL
ANDR	15 -17.1 19.74	61 17.1 80.26	76
FEMI	42 17.1 71.19	17 -17.1 28.81	59
TOTAL	57	78	135

STATISTICS FOR 2-WAY TABLES:

CHI-SQUARE	36.041	DF=1	PROB=0.0001
PHI	-0.517		
CONTINGENCY COEFFICIENT	0.459		
CRAMER'S V	0.517		
LIKELIHOOD RATIO CHI-SQUARE	37.511	DF=1	PROB=0.0001
CONTINUITY ADJ. CHI-SQUARE	33.963	DF=1	PROB=0.0001
FISHER'S EXACT TEST (1-TAIL)			PROB=0.0000
(2-TAIL)			PROB-0.0000

Table 4.8. Chi-square for independent variables - sex-role by self-confidence

TABLE OF CAREER BY SEXROLE

CAREER	SEXROLE		
FREQUENCY ROW PCT	ANDR	FEMI	TOTAL
LOWSCI	25 64.10	14 35.90	39
MEDSCI	32 49.23	33 50.77	65
SCITECH	19 61.29	12 38.17	31
TOTAL	76	59	135

STATISTICS FOR 2-WAY TABLES:

CHI-SQUARE	2.599	DF=2	PROB=0.2727
PHI	0.139		
CONTINGENCY COEFFICIENT	0.137		
CRAMER'S V	0.139		
LIKELIHOOD RATIO CHI-SQUARE	2.608	DF=2	PROB=0.2714

Table 4.9. Chi-square for career by sex-role

TABLE OF CAREER BY SELF

CAREER	SELF		
FREQUENCY/ ROW PCT	NEGAT	POSIT	TOTAL
LOWSCI	27 41.54	38 58.46	65
MEDSCI	66 50.00	66 50.00	132
SCITECH	28 42.42	38 57.58	66
TOTAL	121	142	

STATISTICS FOR 2-WAY TABLES:

CHI-SQUARE	1.711	DF=2	PROB=0.4251
PHI	0.081		
CONTINGENCY COEFFICIENT	0.080		
CRAMER'S V	0.081		
LIKELIHOOD RATIO CHI-SQUARE	1.713	DF=2	PROB=0.4247

Table 4.10. Chi-square for career by self-confidence

in Table 4.8. supported that conclusion, these variables were combined into a dual categorization to allow essentially a three-way Chi-square analysis to be conducted. This was done by pairing androgyny with self-confidence to produce "ANDRNE" (androgynous with negative self-confidence) and "ANDRPO" (androgynous with positive self-confidence). Similar pairings were done between feminine sex-role identity and self-confidence to produce "FEMNEG" and "FEMPOS" categories. This duality was performed only to enhance interpretive ability of the X^2. These dual variables were then compared to career selection. Table 4.11. presents the findings. This data revealed that by putting the two predictor variables together the resulting probability score was lower than each predictor variable when independently considered. This may have been due, in part, to the smaller number of individuals in some of the cells (<5).

SUMMARY

By utilizing various statistical procedures, the independent and dependent variables were closely examined in order to determine if either predictor variable, alone or jointly, was significantly predictive of the criterion variable. According to the results, the criterion variable could be anticipated best by an individual's self-confidence level.

TABLE OF CATEGORY BY CAREER

CATEGORY	CAREER			
FREQUENCY/ ROW PCT/	LOWSCI	MEDSCI	SCITECH	TOTAL
ANDRNE	8 38.10	9 42.86	4 19.05	21
ANDRPO	17 30.91	23 41.82	15 27.27	55
FEMNEG	13 27.08	27 56.25	8 16.67	48
FEMPOS	1 9.09	6 54.55	4 36.36	11
TOTAL	39	65	31	135

STATISTICS FOR 2-WAY TABLES:

CHI-SQUARE	5.842	DF=6	PROB=0.4411
PHI	0.208		
CONTINGENCY COEFFICIENT	0.204		
CRAMER'S V	0.147		
LIKELIHOOD RATIO CHI-SQUARE	6.265	DF=6	PROB=0.3942

*WARNING: Over 20% of the cells have expected counts less than 5. Table is so sparse that Chi-square may not be a valid test.

Table 4.11. Chi-square of Category by Career

Chapter 5

SUMMARY OF STUDY

INTRODUCTION

Women who return to educational institutions do so for a variety of reasons—in order to make themselves more employable, to find new avenues of employment, and/or to grow intellectually. As an institution attempts to attract and better serve this student sub-population, it can benefit from internal research as to what guidance and other support services will best meet the needs of this clientele.

Research literature indicated that, for several reasons, women were under-represented in the science and technical fields even though these fields provided richer employment opportunities (financially, as well as status), and that the women who did enter these fields were less stereotypically feminine and more strongly self-confident. However, it had not been demonstrated how, or even if, the two personality factors (sex-role and self-confidence) were inter-related and if they could be used in tandem to predict career interest areas for incoming students.

A survey of women over thirty years old who had recently returned to a community college was conducted in order to determine their sex-role identity, level of self-confidence, and career interest. Each participant was evaluated separately on the three areas and scores were assigned for each variable. These scores were then examined through the statistical technique of multiple regression to determine whether sex-role identity and/or self-confidence had any predictive ability

regarding career interest. The two personality characteristics were also checked via Chi-square, and were found to have significant inter-relatedness (Chi-square = 36.041, probability = 0.0001). However, a Chi-square between each personality factor and career interest failed to show statistically significant relationships, nor did the multiple regression suggest any major predictive ability upon career selection/interest.

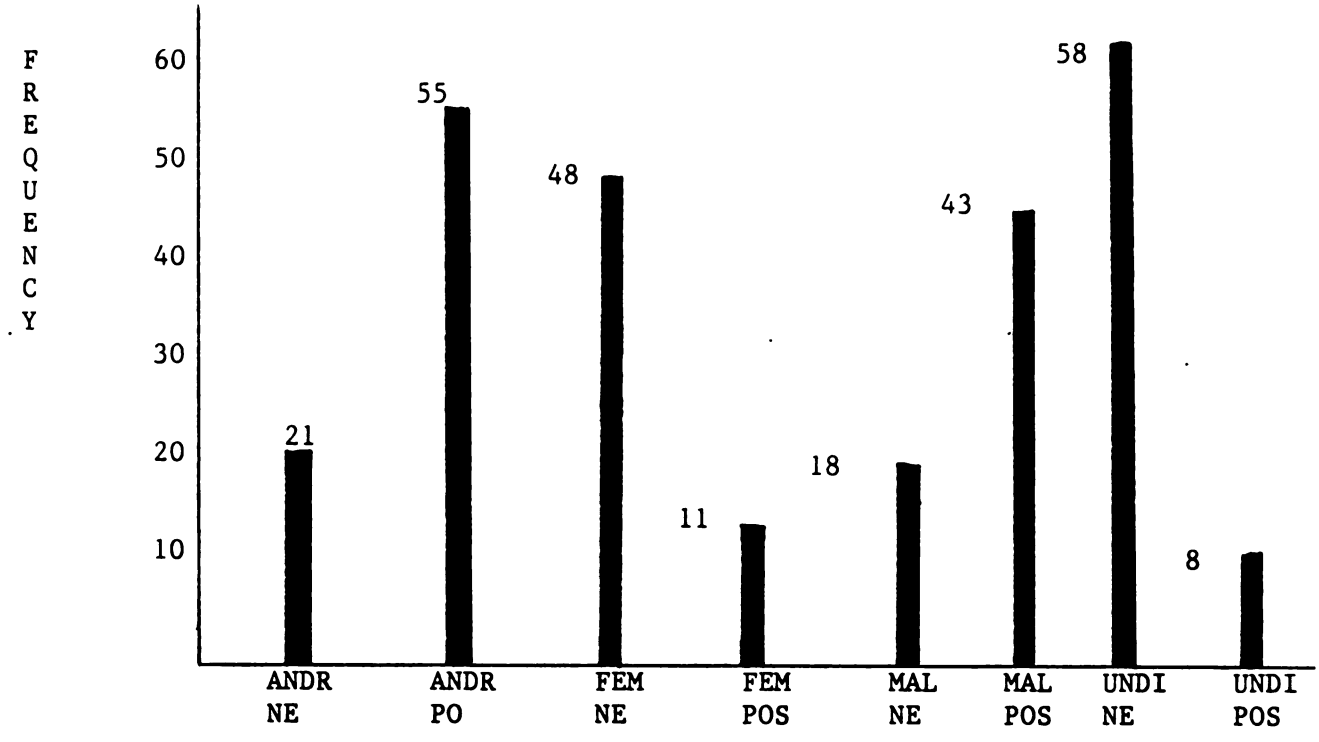
CONCLUSION

Informative data regarding the complexity of adult career selection has been obtained via this research project. The following conclusions arose based on the data.

The sample population was particularly receptive to the research project. This was demonstrated by the high rate of returned survey instruments. Along with this positive indicator there were many solicited/unsolicited comments. The comments ranged from simple requests to see the results to statements as to how answering the questionnaire helped them identify their own strengths and weaknesses. Even though the respondents were busy with life's activities, they set aside time in order to complete the task. Therefore it was concluded that the strategies used to stimulate interest in and support of the project were appropriate to the population.

A positive self-confidence appeared to be directly related to a women's sex-role identity--i.e., the more positive the self-confidence, the more likely the woman was to be androgynous. Androgyny was previously defined as having equal amounts of traditional masculine and

feminine traits. Understanding that these two personality variables directly interact may lead to the enhancement of guidance programs that are designed to aid women. If a woman can be strengthened positively in her self-confidence, one can presume from previously reported research that she will be more able to be open to options, especially in those career clusters requiring higher math prerequisites. The relationship between positive feelings and sex-role identities can easily be seen in the following graph.



*key

Andr = androgyny
Fem = feminine
Mal = masculine
Ne = negative
Pos = positive

Graph 5.1. Relative strength of Sex-Role Identity and Self-confidence among all respondents in research population

The results reflected in the table provide a rationale and basis for remediation efforts by guidance/career counselors in working with women who return to school. That is, identifying which of these personality traits a client is most willing and able to modify, a counselor is likely to more easily effect a change in the counselee's career attitudes and goals.

The major emphasis of the research project was to utilize the two personality characteristics--sex-role and self-confidence--in order to predict the career avenue(s) an individual woman would select. From the data produced, neither sex-role perception nor self-confidence, alone or jointly, produced statistically significant predictions in preferred career selection. Therefore, it would appear that career selection in women was attributable to variables other than self-confidence and sex-role identity. Several different variables may potentially form a complex of factors that leads an individual to a career decision.

What might be the reason(s) for the F score produced? The population itself had been selected and perceived as normal, adult females; however, they may have been quite atypical. Were these women more socially-economically-educationally similar than the population-at-large? They had each personally committed themselves to return to school--the local community college--and could afford the same tuition (albeit some would be pinched financially). Another sample aspect may well have been their initial self-confidence about themselves and their sex-role. Perhaps being over thirty years old, these women arrived at career selection not even viewing the sciences as a viable option. Hence, regardless of the sex-role identity of self-confidence

they had attained, science might have been avoided only on the basis of childhood foundations long since forgotten. Time to attain a career, another pertinent possibility, may also have been a factor in the sample population's choice of college (community college vs. four year institution) and lack of interest in the sciences. Science careers, viewed as requiring additional years of study and a thorough grounding in math (generally women have less background), would be eliminated as a career choice if immediate job placement were desired/required. This potpourri would be potential cause of a "too small" within-sample variance for the G.L.M. to ferret out significant roles of prediction in either of the two independent variables.

Since careers apparently were chosen regardless of the proposed "predictors," other variables need to be examined so that women may be overtly encouraged to select careers from a more extensive and global pool of possibilities for personal and occupational fulfillment.

RECOMMENDATIONS

This study statistically supported research findings that indicated sex-role identification impacts upon self-confidence and vice versa. The more androgynous a woman's sex-role perception, the more positive was her level of self-confidence. However, these two characteristics, either separately or jointly, did not significantly predict a career selection as had been hypothesized. The G.L.M. and Chi-square findings produced insignificant statistical support for any of the three original hypotheses, although there is some indication that the predictor variables are important to career selection.

To enhance further studies in this area, the definition of terms used currently throughout the questionnaire and the literature may have to be more carefully examined. Two researchers, Lunneborg (1979) and Greenfeld (1980), have examined sexual dimorphism in two words frequently used in relation to careers--"service" and "success." Males were found to define service as subserviance to others, whereas females used the term to mean helping others. Success, as well, had two meanings--in males it was equivalent to power, control and money, while in females it was defined in more personal terms--meeting inner needs, friendship, ability to relate to and with others.

Androgyny had been defined in this study as having an equal balance of the traditional masculine and feminine traits. However, Mezydlo (1980) felt that perhaps this term does not represent an increase in masculine traits as much as the elimination of "undesirable" feminine traits such as submissiveness, meekness, and passivity.

If, in fact, the above terms have this latitude of definition, then further research in the implications of this would seem warranted, to ensure that the population being studied, and those conducting such studies, are in agreement concerning how these concepts are to be interpreted.

The research population, though supportive of the project (as exhibited by the high return rate of the survey instrument), appeared to lack some of the needed attributes of a random sample. In order to have avoided the problem the following recommendation would be relevant. An increase in the size of the study group population would have lessened the impact of the initial loss of 55 questionnaires, due to incomplete

BEM sex-role inventories, on the statistical treatments employed--especiallly when the Chi-square with dual categories had been used. The low numbers in some of the cells were below the required amount needed to interpret the data with a high degree of certainty.

The population consisted of only returning female students, which therefore eliminated any women unable to commit themselves to school--emotionally or financially. The identified population could then be considered to be special and probably more homogeneous than the unstudied population, since whatever variables kept the latter group away had been eliminated by their absence. Those unknown variables might have been self-confidence and sex-role identity; hence, this research was unable to discover or analyze their effect.

Since only community college returnees were examined one cannot necessarily extrapolate the findings to other higher education settings, such as returnees to a four-year educational system who may have broader career interests and stronger prerequisite knowledge. Community colleges have been noted for providing career opportunities that are on a faster entry track and require less formal education than the standard four-year college/universities. The attempt to enter the paid labor force quickly and more easily could potentially cause individuals to avoid science because of the belief that the preparatory time for science careers is too extensive for them to undertake. Wise (1979) and Fox (1980) had found that those lacking the math prerequisites for science careers rarely made them up once entering college. It is likely that this could consequently eliminate science careers from further consideration, especially among the community college women.

If the four-year college population has higher levels of self-confidence or is more androgynous than their community college counterparts, then it is possible that they would also be able to avail themselves of more diverse career selection. Perhaps the research population had already selected their realities and were responding accordingly, as Rossi (1965) found they were more likely to do. These realities may have been: a pre-E.R.A. mindset that science is for males and therefore (regardless of confidence or androgynous levels) an adult woman would not even consider science; the need/desire for immediate job placement caused the avoidance to science careers because they believe that the preparatory time is too extensive to undertake; and, the lack of background in math prerequisites eliminated them from entering those fields. These "realities" need to be controlled for in order to judge what variable(s) act in the career selection process. Perhaps self-confidence/sex-role identity determine the reality and these other variables select the career. If that is so, this study would, by not controlling for them, not be able to show that particular statistical correlation.

Therefore it is recommended that 1) future studies should attempt to evaluate or control for these proposed other significant variables; 2) a similar research study be done on returning women students at four-year colleges; and 3) a more global population be studied to include non-returning women. With knowledge garnered from such research, it would enlighten the factors behind career selection.

Recommendations for changing the career interest survey are based upon the following finding from this research study. When a factor

analysis was run on all the items in Part C, a low level of scoring coefficients was derived for all of the career categories. This suggests that perhaps the abbreviation of Part C may have weakened its internal validity and consequently its power to discriminate respondent preferences for high versus low science/technology-oriented careers. This possibility must be carefully considered, given the fact that the responses to the other two instruments (Part A and Part B) had matched their national normative data, and were consistent with the findings revealed in the literature search.

Because the career-selection instrument had been modified, a different process was used to analyze the responses to Part C. A factor analysis was done in order to force data reduction and find any underlying pattern(s) in career orientation, as reflected in the item responses. The highest scores obtained via the factor analysis were found under factor one and produced by the following activities: "finding new ways to make nylon cloth" (.68741)--a professional technical interest area; and, "taking measurements to find defects in eyeglasses" (.68501)—a skilled science interest area. In general, the science-technical activities did fall under factor one as expected, but the factor patterns scored primarily between 0.4-0.5. This apparent finding supported the likelihood that the instrument, as modified and used, had insufficient discrimination in the items to adequately identify career interest areas.

Perhaps it would be best if the entire COPSystem inventory were used to allow for more variation among the career clusters. The use of the entire COPSystem Interest Inventory or another career instrument

would be recommended in order to procure better discrimination of career areas and career interests. The lack of apparent statistical variation among the various career areas could have stemmed from the abbreviated instrument. By using the entire inventory or utilizing a more definitive tool, it is anticipated that this problem could be eliminated. If the instrument's length is deemed to be inhibitory, then perhaps a different and shorter career instrument could be selected.

Some of the respondents commented that they did not like the inability to answer "undecided"; an instrument that provided that opportunity might be more effective in providing for a full range of responses. It must be noted, however, that one of the presumed pluses of the COPSystem inventory is that it requires a choice that indicates a preference.

Another recommendation concerns the possible use of an instrument with a different format to measure career preferences--i.e., one that does not use career tasks to determine career appropriateness for the individual. Research has indicated that career tasks do not equate with career labels; therefore, one might not dislike the task described but could dislike the career that the task originates from (and vice versa). An example might be the tasks cleaning test-tubes, using a microscope, drawing blood samples. A person may enjoy the idea of helping a sick person and feel positive about taking blood samples, but may not be interested in using a microscope and may dislike cleaning test-tubes; yet they may feel either positive/negative about being a medical technologist. [Krefting, 1978 and Erlick, 1977] The use of other career instruments, such as O'Neil and Ohlde's Career Factor

Checklist (CFC) or Ohlde and O'Neil's Career Appropriateness Questionnaire (CAQ), that assess respondent views of how appropriate a career would be, is therefore suggested.

Regardless, the lack of predictive ability in the model is, according to this researcher, primarily based upon the inadequacy of a reliable career instrument. This would appear to be a fruitful area for further research.

IMPLICATIONS

The research findings have strong implications for how social and educational systems manage the environment to maximize learning and therefore enhance future career decisions.

Since self-confidence and sex-role appeared to be very highly correlated, and a positive self-confidence was more likely to be seen in androgynous females, one can determine that helping young girls or women to see themselves positively may be related to seeing themselves as less traditionally feminine. For adult women, the lack of traditional role identification must be understood to not equate with a rejection of the positive feminine attributes but the rejection of those qualities that diminish an otherwise capable and accomplished person. For young girls, it then becomes important to provide role models that demonstrate confidence and competence while not presenting highly masculinized images.

Since a lack of appropriate academic prerequisites was also noted to inhibit future career choice, it becomes imperative that guidance counselors--especially those in the junior and senior high

school when girls begin to avoid math--encourage and point out to students the value in taking these courses. Overt action by teachers and counselors alike is necessary to point out career possibilities to students. Making sure that these actions are sex-label free can only enhance the opportunities of each sex to make a career choice best suited to their abilities rather than their sex.

The knowledge that career selection is not simply determined by only sex-role identity and/or self-confidence can spur further research into other areas as well. How much does what a person does/does not do in high school affect their career selection? Does the dream change or the reality of accomplishment? Can a person ever go back, start fresh, or does all the excess baggage (failures, successes) travel with them to cause the inhibition of career selection success? Does, in fact, the lack of flexible work hours or job description in various occupations cause women to avoid an otherwise appropriate career? Do the different definitions of "success" mean that women and men will never see a career in the same light, or are women changing the definition in order to avoid role conflict? All these issues were beyond the scope of this study, but are worthy of future research to shed more light on this important and complex subject.

APPENDIX A

ORIGINAL INSTRUMENT

PART A: Personality Interview

In this inventory, you will be presented with sixty personality characteristics which will be used to describe yourself. Please indicate, on a scale of 1 to 7, how well each characteristic describes you.

1	2	3	4	5	6	7
Never or Almost Never True	Usually Not True	Sometimes But Infrequently True	Occasionally True	Often True	Usually True	Always or Almost Always True

Thus, if you feel it is sometimes but infrequently true that you are "sly," never or almost never true that you are "malicious," always or almost always true that you are "irresponsible," and often true that you are "carefree," you would rate these characteristics as follows:

3 sly
1 malicious

7 irresponsible
5 carefree

____ 1.	Self-reliant	(110)
____ 2.	Yielding	(111)
____ 3.	Helpful	(112)
____ 4.	Defends own beliefs	(113)
____ 5.	Cheerful	(114)
____ 6.	Moody	(115)
____ 7.	Independent	(116)
____ 8.	Shy	(117)
____ 9.	Conscientious	(118)
____ 10.	Athletic	(119)
____ 11.	Affectionate	(120)
____ 12.	Theatrical	(121)
____ 13.	Assertive	(122)
____ 14.	Flatterable	(123)
____ 15.	Happy	(124)
____ 16.	Has strong personality	(125)
____ 17.	Loyal	(126)
____ 18.	Unpredictable	(127)
____ 19.	Forceful	(128)
____ 20.	Feminine	(129)
____ 21.	Reliable	(130)
____ 22.	Analytical	(131)
____ 23.	Sympathetic	(132)
____ 24.	Jealous	(133)
____ 25.	Has leadership abilities	(134)
____ 26.	Sensitive to the needs of others	(135)
____ 27.	Truthful	(136)
____ 28.	Willing to take risks	(137)
____ 29.	Understanding	(138)
____ 30.	Secretive	(139)
____ 31.	Makes decisions easily	(140)
____ 32.	Compassionate	(141)
____ 33.	Sincere	(142)
____ 34.	Self-sufficient	(143)
____ 35.	Eager to soothe hurt feelings	(144)
____ 36.	Conceited	(145)
____ 37.	Dominant	(146)
____ 38.	Soft-spoken	(147)
____ 39.	Likable	(148)
____ 40.	Masculine	(149)
____ 41.	Warm	(150)
____ 42.	Solemn	(151)
____ 43.	Willing to take a stand	(152)
____ 44.	Tender	(153)
____ 45.	Friendly	(154)
____ 46.	Aggressive	(155)
____ 47.	Gullible	(156)
____ 48.	Inefficient	(157)
____ 49.	Acts as a leader	(158)
____ 50.	Childlike	(159)
____ 51.	Adaptable	(160)
____ 52.	Individualistic	(161)
____ 53.	Does not use harsh language	(162)
____ 54.	Unsystematic	(163)
____ 55.	Competitive	(164)
____ 56.	Loves children	(165)
____ 57.	Tactful	(166)
____ 58.	Ambitious	(167)
____ 59.	Gentle	(168)
____ 60.	Conventional	(169)

Please turn over for next part

Part B: Self-Perception

Directions: Please read the following adjectives and put an x in the box beside each one you would consider to be self-descriptive. Do not worry about duplications or contradictions, and so forth. Work quickly and do not spend too much time on any one adjective. Try to be frank and check only those adjectives which describe you as you really are, not as you would like to be.

Active	____	(170)	Intelligent	____	(227)
Ambitious	____	(171)	Interests narrow	____	(228)
Artificial	____	(172)	Interests wide	____	(229)
Assertive	____	(173)	Inventive	____	(230)
Capable	____	(174)	Lazy	____	(231)
Cautious	____	(175)	Mannerly	____	(232)
Clear thinking	____	(176)	Meek	____	(233)
Clever	____	(177)	Nagging	____	(234)
Commonplace	____	(178)	Original	____	(235)
Confident	____	(179)	Outspoken	____	(236)
Conservative	____	(180)	Quiet	____	(237)
Conventional	____	(210)	Reflective	____	(238)
Courageous	____	(211)	Reserved	____	(239)
Determined	____	(212)	Resourceful	____	(240)
Dissatisfied	____	(213)	Self-confident	____	(241)
Dull	____	(214)	Selfish	____	(242)
Egotistical	____	(215)	Sexy	____	(243)
Energetic	____	(216)	Sharp-witted	____	(244)
Enterprising	____	(217)	Silent	____	(245)
Enthusiastic	____	(218)	Sincere	____	(246)
Good-looking	____	(219)	Snobbish	____	(247)
Healthy	____	(220)	Sociable	____	(248)
Honest	____	(221)	Strong	____	(249)
Hostile	____	(222)	Submissive	____	(250)
Humorous	____	(223)	Suspicious	____	(251)
Individualistic	____	(224)	Unconventional	____	(252)
Informal	____	(225)	Weak	____	(253)
Insightful	____	(226)	Withdrawn	____	(254)

PART C: Career Selection

On this sheet are listed activities performed in many different kinds of occupations. You are to decide whether or not you would like to perform the activity listed. Read each one carefully and answer as best you can. You may not be too familiar with some of the activities, some of which require training you may not have had. However, in such instances try to determine your feelings toward the activity. Disregard considerations of salary, social standing or future advancement. For each item decide the degree of your interest or disinterest in the activity, and mark the appropriate box.

Example: Run computer programs and analyze the data output.

1	2	3	4
LIKE VERY MUCH	LIKE MODERATELY	DISLIKE MODERATELY	DISLIKE VERY MUCH
=	=	=	=

	1 LIKE VERY MUCH	2 LIKE MODERATELY	3 DISLIKE MODERATELY	4 DISLIKE VERY MUCH	
Act in a movie or play.	=	=	=	=	(255)
Counsel people with marriage or personal problems.	=	=	=	=	(256)
Install or connect electrical wiring systems.	=	=	=	=	(257)
Take and compare fingerprints.	=	=	=	=	(258)
Repair and overhaul automobile or aircraft engines.	=	=	=	=	(259)
Do research on the effects of vitamins on the growth of lab animals.	=	=	=	=	(260)
Design artistic furniture.	=	=	=	=	(261)
Be in charge of a trade or vocational school.	=	=	=	=	(262)
Do color illustrations for a magazine or book.	=	=	=	=	(263)
Conduct a youth group leadership training program.	=	=	=	=	(264)
Study rocks and fossils to find minerals.	=	=	=	=	(265)
Be responsible for making the structural design of a large building.	=	=	=	=	(266)
Clean and fill glass test tubes.	=	=	=	=	(267)
Find the trouble and repair washing machines, TV's or other appliances.	=	=	=	=	(268)
Type and file letters, bills and receipts.	=	=	=	=	(269)
Play a musical instrument in an orchestra.	=	=	=	=	(270)
Teach recreational activities to disabled patients.	=	=	=	=	(271)
Sort and route mail in a post office.	=	=	=	=	(272)
Develop a process for making plastic.	=	=	=	=	(273)
Make dental plates and false teeth.	=	=	=	=	(274)
Cut and install wood paneling and cabinets in new construction.	=	=	=	=	(275)
Take daily measurements of chemical powders used to make pills in a drug factory.	=	=	=	=	(276)
Find errors in a bank statement or list of numbers.	=	=	=	=	(277)
Edit a section of a newspaper or journal.	=	=	=	=	(278)
Prepare and cook food in a restaurant or hotel.	=	=	=	=	(279)
Do surgical operations in hospital.	=	=	=	=	(310)
Engineer the design of a new kitchen appliance.	=	=	=	=	(311)
Test blood samples to find traces of alcohol.	=	=	=	=	(312)

	1 LIKE VERY MUCH	2 LIKE MODERATELY	3 DISLIKE MODERATELY	4 DISLIKE VERY MUCH	
Retouch photographs.	=	=	=	=	(324)
Guide people on a sightseeing tour.	=	=	=	=	(325)
Study the effects of chemicals on plants and animals.	=	=	=	=	(326)
Research the design and manufacture of electronic parts.	=	=	=	=	(327)
Study information about the sun and stars.	=	=	=	=	(328)
Make paintings showing the design of a new building.	=	=	=	=	(329)
Lead young adults in recreational activities.	=	=	=	=	(330)
Edit for publication the diary and letters of a famous person.	=	=	=	=	(331)
Develop and print pictures in a photographers' darkroom.	=	=	=	=	(332)
Classify and catalog books for a library.	=	=	=	=	(333)
Select and arrange furniture and draperies for a stage set.	=	=	=	=	(334)
Spray chemicals on floors to meet health standards.	=	=	=	=	(335)
Apply plaster or set bricks in a wall of new building.	=	=	=	=	(336)
Perform routine tests in a medical lab.	=	=	=	=	(337)
Repair pipe systems and install plumbing fixtures.	=	=	=	=	(338)
Advise persons on methods to reduce poverty and disease.	=	=	=	=	(339)
Take readings of air pressure, temperature and wind.	=	=	=	=	(340)
Operate a power shovel or other heavy equipment.					(341)
Do chemical research in an industrial lab.	=	=	=	=	(342)
Develop uses for new energy sources.	=	=	=	=	(343)
Write a daily column for a newspaper.	=	=	=	=	(344)
Arrange flower displays.	=	=	=	=	(345)
Learn how ocean currents effect the weather.	=	=	=	=	(346)
Design a highway traffic exit.	=	=	=	=	(347)
Study the cause and find cures for diseases.	=	=	=	=	(348)

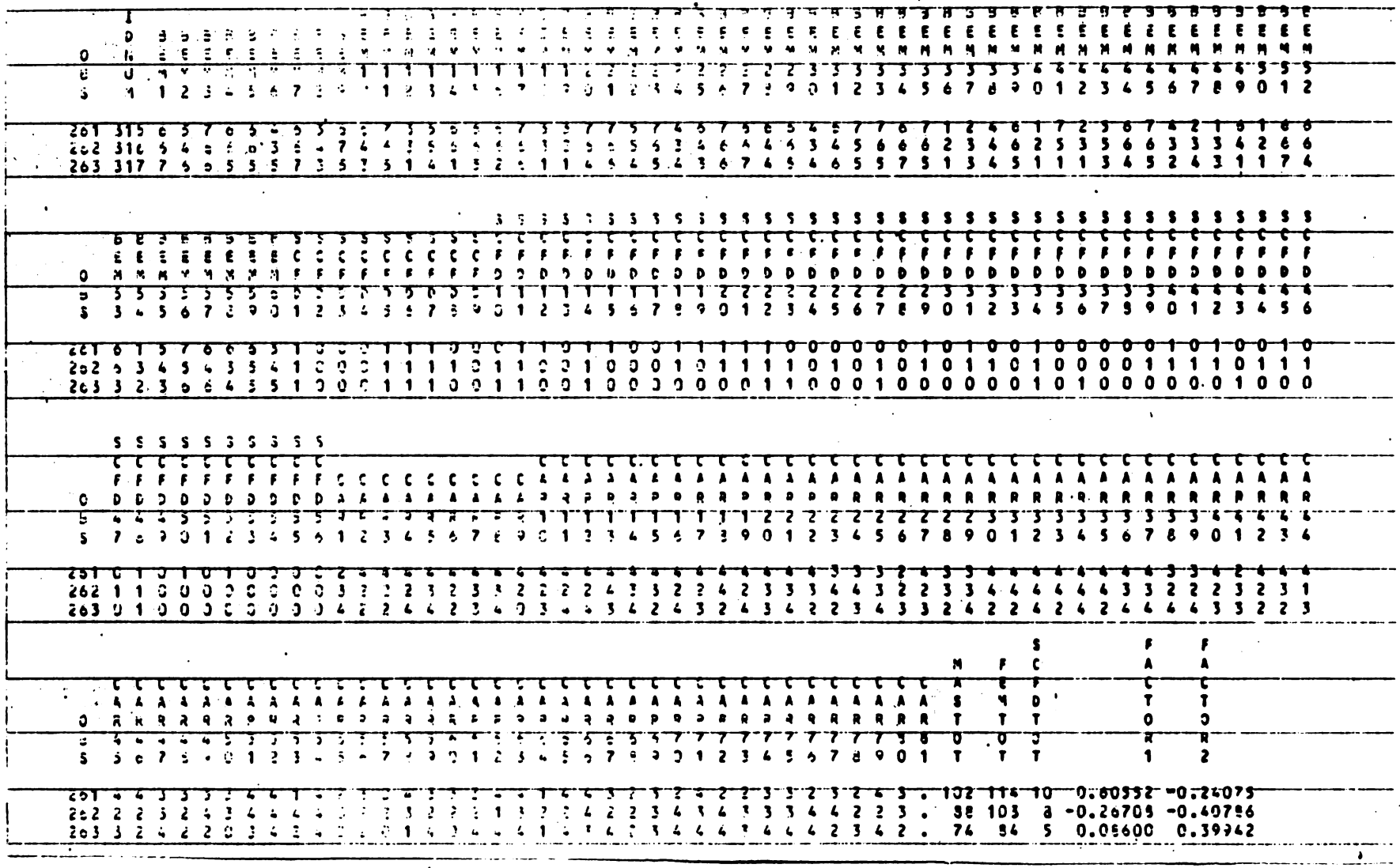
Please turn over to complete

	1 LIKE VERY MUCH	2 LIKE MODERATELY	3 DISLIKE MODERATELY	4 DISLIKE VERY MUCH	
Do surgical operations in hospital.	—	—	—	—	(310)
Engineer the design of a new kitchen appliance.	—	—	—	—	(311)
Test blood samples to find traces of alcohol.	—	—	—	—	(312)
Talk lawmakers and politicians into passing certain laws.	—	—	—	—	(313)
Call on customers to introduce and sell new products.	—	—	—	—	(314)
Evaluate risks and apply rates for insurance plans.	—	—	—	—	(315)
Apply roofing material or tile on buildings.	—	—	—	—	(316)
Take measurements to find defects in eyeglasses.	—	—	—	—	(317)
Operate a machine to make or repair metal parts.	—	—	—	—	(318)
Help a dentist make fillings for teeth.	—	—	—	—	(319)
Use small hand tools to finish wood surfaces.	—	—	—	—	(320)
Sell automobiles or home appliances.	—	—	—	—	(321)
Write short stories for publication.	—	—	—	—	(322)
Decorate a store window.	—	—	—	—	(323)

	1 LIKE VERY MUCH	2 LIKE MODERATELY	3 DISLIKE MODERATELY	4 DISLIKE VERY MUCH	
Plot the course of a ship.	—	—	—	—	(349)
Sell life insurance.	—	—	—	—	(350)
Design a space station.	—	—	—	—	(351)
Do cancer research.	—	—	—	—	(352)
Find new ways to make nylon cloth.	—	—	—	—	(353)
Solve math problems in chemical research.	—	—	—	—	(354)
Supervise the construction of a major bridge.	—	—	—	—	(355)
Manage an accounting system for a large business organization.	—	—	—	—	(356)
Handle payments and withdrawals for customers in a bank.	—	—	—	—	(357)
Plan or prepare meals in a hospital or cafeteria.	—	—	—	—	(358)
Cut and sew fabric on a machine.	—	—	—	—	(359)
Record customer's orders and phone messages.	—	—	—	—	(360)
Promote sales of houses or apartments.	—	—	—	—	(361)

APPENDIX B

Career Factoring: DATASET FROM PROC SCORE



Appendix B

Career Factoring: DATASET FROM PROC SCORE

APPENDIX C

INTRODUCTORY LETTER

MICHIGAN STATE UNIVERSITY

COLLEGE OF EDUCATION
DEPARTMENT OF EDUCATIONAL ADMINISTRATION
ERICKSON HALL

EAST LANSING • MICHIGAN • 48824-1034

November 23, 1984

Dear Student:

You have been selected to participate in a research project whose results should be of considerable value to those who are interested in the academic and career success of women returning to college. With your help, this study can improve vocational guidance programs at the community college, by learning more about how and why women select careers. This study has been approved by, and is being conducted in cooperation with, Tidewater Community College. Its goal is to help identify some of the factors that influence the presence/absence of women in science-related fields.

Your name and social security number which appear on the address label will be used only to identify nonrespondents for follow-up purposes. No individual respondent will be identified, and only aggregated data will be utilized. Your participation in this study is purely voluntary; if you wish not to participate, please return the unanswered questionnaire in the enclosed envelope. Your comments are most welcome concerning any aspect of this study, and I shall be pleased to send you a summary of the results if you desire.

Your participation in this study is important, because your responses will provide insights on how community colleges can better serve women like yourself who are an important and growing segment in higher education today. It would be greatly appreciated if you would complete this information and return it today, using the enclosed stamped envelope. Other phases of this research cannot be continued until I complete the analysis of this data.

Thank you very much for your cooperation--your response makes a difference!

Sincerely,

Jill L. Hoehlein
Department of Educational Administration

I just wanted to let you know how much I appreciate your participation in this survey, espicially since I know how busy this time of year can be. Your help will make a big difference. Jill

APPENDIX D

FOLLOW-UP LETTERS TO INDIVIDUALS WHOSE SURVEY WAS NOT RETURNED

MICHIGAN STATE UNIVERSITY

COLLEGE OF EDUCATION
DEPARTMENT OF EDUCATIONAL ADMINISTRATION
ERICKSON HALL

EAST LANSING • MICHIGAN • 48824-1034

December 6, 1984

Dear Student:

Enclosed is a copy of the questionnaire previously mailed to you. Since this study is designed to help improve vocational guidance programs, to better serve women like yourself, it is highly desirable to have input from as many women as possible.

If you have already responded to the questionnaire, please disregard this letter. If you never received or lost the original questionnaire, I have sent you another. I would greatly appreciate if you would complete this questionnaire today and return it in the self-addressed, stamped envelope.

Please keep in mind that the address label at the top of the questionnaire is only for follow-up purposes. Your individual response will be kept strictly confidential and will only be used with other responses to determine group results. Please feel free to write in any comments, and if you desire, I will be happy to send you a summary of results.

Thank you for your cooperation.

Sincerely,

Jill L. Hoehlein
Department of Educational Administration

I hope you can take a few minutes to participate in this survey - your contribution will really help!
Thanks

MICHIGAN STATE UNIVERSITY

COLLEGE OF EDUCATION
DEPARTMENT OF EDUCATIONAL ADMINISTRATION
ERICKSON HALL

EAST LANSING • MICHIGAN • 48824-1034

January 7, 1985

Dear Student:

About a month and a half ago you received a letter asking for your cooperation in a research project. This study is designed to help improve vocational counseling and aid women who return to school in order to change or find new careers. For this research to be a success, I need as many responses from women like you as possible.

Your confidentiality will be maintained as only collective data will be used. The name and social security number which appear on the address label are used only to identify nonrespondents for follow-up letters.

If you misplaced or never received your questionnaire, I have enclosed another. Please complete it now and return it to me today. Remember, your response is important!

Thank you for your cooperation.

Sincerely,

Jill L. Hoehlein
Department of Educational Administration

APPENDIX E

ACCEPTANCE LETTER FROM UCRIHS

MICHIGAN STATE UNIVERSITY

UNIVERSITY COMMITTEE ON RESEARCH INVOLVING
HUMAN SUBJECTS (UCRIHS)
238 ADMINISTRATION BUILDING
(517) 355-2186

EAST LANSING · MICHIGAN · 48824

September 6, 1984

Ms. Jill Losee Hoehlein
1901 Windjammer Court
Virginia Beach, Virginia 23454

Dear Ms. Hoehlein:

Subject: Proposal Entitled, "A Study to Improve Vocational Guidance Programs at the Community College"

UCRIHS review of the above referenced project has now been completed. I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and the Committee, therefore, approved this project at its meeting on August 6, 1984.

You are reminded that UCRIHS approval is valid for one calendar year. If you plan to continue this project beyond one year, please make provisions for obtaining appropriate UCRIHS approval prior to August 6, 1985.

Any changes in procedures involving human subjects must be reviewed by the UCRIHS prior to initiation of the change. UCRIHS must also be notified promptly of any problems (unexpected side effects, complaints, etc.) involving human subjects during the course of the work.

Thank you for bringing this project to our attention. If we can be of any future help, please do not hesitate to let us know.

Sincerely,

Henry E. Bredeck
Chairman, UCRIHS

HEB/jms

cc: Raines

APPENDIX F

ACCEPTANCE LETTER FROM TIDEWATER COMMUNITY COLLEGE

TIDEWATER COMMUNITY COLLEGE
STATE ROUTE 135
(804) 484-2121

DISTRICT OFFICE
PORTSMOUTH, VIRGINIA
23703

December 14, 1983

Mrs. Jill Hoehlein
1901 Windjammer Court
Virginia Beach, Virginia 23454

Dear Jill:

I am pleased to notify you that your request for assistance in the research portion of your doctoral dissertation effort has been approved by the Tidewater Community College administrative staff. We will be pleased to assist you in whatever manner that we can. Specifically, we will be able to provide you with the mailing labels for the students who comprise the population with which your study is concerned. Please contact Dr. W. Kevin Hunt, Director-Research, Planning and Data Services, and inform him of your particular needs. You may contact him by calling (804) 484-2121, Ext. 345 or SCATS 8-842-3345.

I am sure that you are aware of the need for appropriate sensitivity when requesting information from faculty and students, and I would appreciate it if you would make clear in all of your correspondence to them that (1) their assistance is requested as part of a doctoral dissertation study; (2) that any information that they provide will be used only in aggregate form, without individual identity; and (3) that participation in the study is purely voluntary.

Again, I am pleased that Tidewater Community College is able to assist you in your dissertation effort. Best wishes for a successful study.

Sincerely,

Robert J. Grymes, Jr.
Dean-Instructional and
Student Services

RJGjr/aw
cc: Dr. George Pass
Dr. W. Kevin Hunt

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