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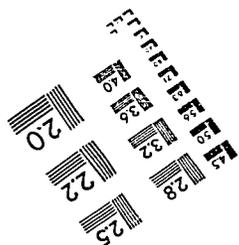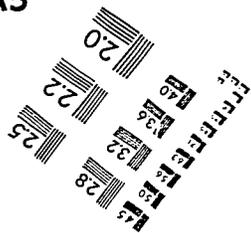5.0

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ABSTRACT
                Recent developments in science and technology
challenge educators to develop career education approaches that
promote interest in scientific and technological career options among
students. One way to meet this challenge is for educators to
understand variables that may influence the career development of
students with focused or developed interest and ability in science
and mathematics. This study was conducted to investigate the
relationship among selected psychosocial variables and attitudes
toward career choice processes of high school students with interest
and ability in science and mathematics. The study tested the unique
contributions of socioeconomic status, self-esteem, parental
influence, and the influence of significant people outside of home
and family in predicting the maturity of career choice attitudes of
147 high school students participating in a summer science and
engineering apprentice program. Subjects completed the Rosenberg
Scale to measure self-esteem, the Career Maturity Inventory, and a
student data form. A stepwise regression analysis was used to examine
the relationship of the independent variables to the dependent
variable of career maturity. The results of the analysis revealed
that the independent variables of self-esteem, parental influence,
socioeconomic status, and mentor influence had significant
relationships with career maturity. Implications of the findings for
educators are discussed. A 19-item reference list and three tables
are included. (Author/NB)

Predicting the Career Choice

Attitudes of High School Students with

Interest and Ability in Science and Mathematics*

Courtland C. Lee
Associate Professor
Counseling Psychology Program
School of Education
112 Peabody Hall   037A
University of North Carolina at Chapel Hill
Chapel Hill, N.C.   27514

Elaine K. Hollander
Professor
College of Education and Human Ecology
University of the District of Columbia
Washington, D.C.   20008

Marylin Krupsaw
Program Director
Department of Defense, Summer Science and Engineering
Center for Applied Research
University of the District of Columbia
Washington, D.C.   20008

Running Head: CAREER CHOICE ATTITUDES

ABSTRACT

Predicting the Career Choice Attitudes

of High School Students with Interest

and Ability in Science and Mathematics

The purpose of this study was to investigate the relationship among selected psychosocial variables and one aspect of the career development of high school students with interest and ability in science and mathematics--attitudes toward career choice processes. The study tested the unique contributions of socioeconomic status, self-esteem, parental influence and the influence of significant people outside of home and family in predicting the maturity of career choice attitudes of 147 high school students participating in a summer science and engineering apprentice program. A stepwise regression analysis was used to examine the relationship of the independent variables to the dependent variable: career maturity. The results of the analysis suggested that the independent variables had significant relationships with career maturity. Implications of the findings for educators are discussed.

Predicting the Career Choice Attitudes

of High School Students with Interest

and Ability in Science and Mathematics

Over the past 20 years, society has witnessed unparalleled development in science and technology. Advances in areas such as space technologies, computer applications, biochemistry, subatomic physics, alternative energy sources and satellite communications, for example, have transformed the world of work. Implicit in this transformation is a challenge to educators to develop career education approaches that foster interest in scientific and technological career options among contemporary youth.

One way of meeting this challenge is for educators to better understand variables that may influence the career development of students with focused or developed interest and ability in science and mathematics. Awareness of the career development variables related to this select group could lead to a new body of knowledge related to career counseling and education. Improved techniques of guidance for careers in scientific and technological careers might be developed.

The purpose of this study was to investigate the relationship among selected psychosocial variables and one aspect of the career development of high school students with interest and ability in science and mathematics-- attitudes toward career choice processes. Specifically, the study examined the psychological and social factors related to the maturity of feelings, subjective relations and dispositions such young people have toward making a career choice and entering the world of work. The maturity of attitudes about

the career choice process has been defined as career maturity (Crites, 1974).
While there is a paucity of research literature on the relationship among
independent variables in the career development of high school students with
interest and ability in science and mathematics, studies of general adolescent
career development (Greenhaus, 1971; Lawrence & Brown, 1976; Lee, 1984;
Maynard & Hansen, 1970) reported significant relationships among several
career development variables, one of them being career maturity. Such studies
provide a theoretical framework and empirical basis for the investigation of
this variable among students with interest and ability in science and
mathematics. The role of self-esteem in the career choice attitudes of these
students was explored in the present study, because it has been suggested that
the development and implementation of variables related to self-perception
play a major role in the career development process (Super, 1953).
Self-constructs have been found to have significant relationships with career
maturity in recent research (Lawrence & Brown, 1976; Lee, 1984; McNair &
Brown, 1983). Second, the study investigated the role of perceived parental
influence on the maturity of career choice attitudes among students with
scientific and mathematical ability and interest, because research has
indicated that parental role models may play a crucial part in career
development (Lee, 1984; McNair & Brown, 1983). Third, the relationship of
significant other people outside of the home and family to the career choice
attitudes of this group of young people was examined, because studies of
adolescent career development have suggested that this process may be
influenced by such people (DeBord & Griffin, 1977; Otto, 1976).

Finally, the relationship of socioeconomic status to the career choice

attitudes of this select group of high school students was investigated. The previous findings of Berman (1972) and Dillard (1976) suggest an important · relationship between this variable and aspects of adolescent career development.

With respect to these variables, the present study tested the unique contributions of socioeconomic status, self-esteem, parental influence, and the influence of significant people outside the home and family in predicting the career choice attitudes of high school students with interest and ability in science and mathematics.

Method

Participants

The participants for this study were high school students nominated by their science and/or mathematics teachers for a summer science and engineering apprentice program conducted in the Northeastern section of the country. These students came from high schools throughout the United States.

The apprentice program, conducted through the applied research center at an urban university, provided experience and exposure to the world of scientific research by offering paid apprenticeships to students interested in science and engineering. Participants were assigned to one of 17 scientific laboratories associated with the armed forces. They worked an eight-hour day, five days a week, for eight weeks, with a scientist or engineer who served as a mentor.

The sample for the study consisted of 147 students, including 82 males and 65 females. There were 106 White participants, 15 Black, and 26 Asian-American.

Instrumentation

The Career Maturity Inventory (CMI) was used to measure career choice attitudes. The CMI is divided into scales for measuring the attitudes and competencies critical in realistic career decision-making. For the purpose of this study, the Attitude Scale, which elicits feelings, subjective relations, and dispositions an individual has toward making a career choice and entering the world of work, was used. Crites (1973) reports Kuder-Richardson (KR) 20 reliability coefficients ranging from .72 to .90. Although some reservations have been expressed about the validity of the CMI, it is generally viewed as an adequate measure of career maturity (Zytowski, 1978). Possible scores on the Attitude Scale range from 0-50.

The Rosenberg Scale (1965) was used to measure self-esteem. This scale was designed to measure attitudes toward the self along a favorable-to-unfavorable dimension. The scale consists of 10 statements regarding self-acceptance, to which a subject responds on a 4-point scale ranging from "strongly agree" to "strongly disagree." It has been shown to have retest reliability of .85 and it correlates well with other self-concept measures (Silber & Tippet, 1965). Possible scores range from 0-30.

A student data form was developed and used to collect information on parental influence, the influence of significant other people (mentor influence), and socioeconomic status.

Parental influence was derived from two separate questions eliciting the perception participants had of the degree of influence their parents had over future career plans. Paternal and maternal influence scores ranged from a low of 50 to a high of 100. Parental measures were averaged to form a parental

influence index with scores ranging from 50 to 100.

In a similar fashion, mentor influence was derived from a question eliciting the perception participants had of the degree of influence significant other people outside of home and family had over future career plans. Mentor influence scores ranged from 50 to 100.

Information from the student data form about breadwinner's occupation was classified using Duncan's Socioeconomic Index Scale based on 1970 census data (Hauser & Featherman, 1977) to arrive at an indication of socioeconomic status. Socioeconomic scores using this index range from 4-96. The form also provided information regarding ethnicity and gender.

Procedures

Participants were administered the Rosenberg Scale, Career Maturity Inventory, and the student data form. Data collection was conducted at science and engineering apprenticeship sites by high school science teachers participating in the program who had been briefed on the purpose of the study and data collection procedures by the principal investigators. The sample consisted of all apprentices present at weekly on-site seminars when data were collected.

Analysis

Pearson product-moment correlation coefficients were used to evaluate relationships among the variables. A stepwise regression analysis (Norusis, 1985) was used to examine the relationship of the independent variables (parental influence, mentor influence, self-esteem, and socioeconomic status) to the dependent variable (career maturity). The dependent variable was regressed on the independent variables to determine the significance of the

independent variables in explaining the variation in the dependent variable. In the stepwise regression procedure, the variable having the highest correlation with the dependent variable is entered in the first step, and those remaining variables that will add the largest amount to the multiple correlation coefficient are selected for the successive steps.

Results

The means and standard deviations of the independent variables and the dependent variable are shown in Table 1. Table 2 contains an intercorrelation matrix for the variables, and the results of the stepwise regression analysis are shown in Table 3.

Insert Table 1 about here

The first steps of the regression analysis entered the self-esteem variable and yielded a coefficient of .357 (p<.01). When only one variable has been entered in a stepwise regression, the coefficient obtained is a simple or zero-order correlation between the dependent variable and the first-entered variable. The remaining steps entered the sequence of variables, parental influence, socioeconomic status, and mentor influence and obtained multiple coefficients of correlation of .373, .374, and .376. When squared (R^2=.14), the final multiple coefficient of correlation, .376, suggests that the four independent variables explain approximately 14% of the variance in the dependent variable, career maturity. F-ratios were used to test the significance of the amount each independent variable adds to the regression (Table 3). The addition of all four independent variables is

statistically significant.

Insert Tables 2 and 3 about here

Discussion

The stepwise regression analysis revealed that the variables self-esteem, parental influence, socioeconomic status and mentor influence had significant relationships with the maturity of career choice attitudes of the participants in this study. The results appear to support earlier findings...on the relationship of psychosocial variables to the maturity of adolescent career choice attitudes.

It was expected that the variable self-esteem, how one sees and accepts oneself, would have a significant relationship with maturity of career choice attitudes among the participants in this study. The results suggest that self-esteem was a significant predictor of career maturity. This finding supports previous research (Lawrence & Brown, 1976; Lee, 1984; McNair & Brown, 1983) and seems to suggest that there may be an important relationship between self-perceptions and acceptance and the level of maturity about making career choices among this select group of students.

In light of previous research findings and theory on the influence of significant other people on career development (Krumboltz, Mitchell, & Jones, 1976; Lee, 1984; McNair & Brown, 1983; Sewell, Haller, & Portes, 1969), it was anticipated that parental influence would have an important relationship with the career maturity of participants in this study. It was found that parental influence did indeed have a significant relationship with the maturity of

career choice attitudes for the students surveyed. Likewise, the influence of significant people outside of the home and family was found to have a significant relationship with career maturity.

The results of this study further suggest that socioeconomic status has an important relationship with the maturity of career choice attitudes for the participants in this study. While several researchers have found that socioeconomic status is not a significant factor in predicting career maturity (Lawrence & Brown, 1976; Lee, 1984; McNair & Brown, 1983), others have found important relationships between that variable and aspects of adolescent career development (Berman, 1972; Moulton & Stewart, 1971). It is evident from this study that social class membership and identification may influence the level of maturity of career choice attitudes among this group of students.

Implications

The purpose of this study was to explore factors related to the maturity of career choice attitudes among high school students with interest and ability in science and mathematics as part of a knowledge-building process for improving career education and counseling for careers in scientific and technological fields. In discussing implications for counseling and educational practice in the findings, it must first be cautioned that the investigation was a correlational study, therefore cause and effect relationships cannot necessarily be drawn. The findings, however, do seem to suggest a certain direction for educators wishing to develop intervention models that foster interest in scientific and technological career options among adolescents.

Educators may need to make concerted efforts to facilitate the maturity

of attitudes toward making a scientific or technological career choice among contemporary adolescents. These young people will be leaving high school in a period of profound technological changes in the world of work. It is important, therefore, that their attitudes toward making career choices and entering the contemporary work world reflect these changes.

In order to accomplish this, educators need to be aware of the potential influence psychological and social variables may have upon adolescent scientific and technological career choice attitudes, and plan interventions accordingly. The findings of this study suggest, for instance, that educators attempting to facilitate the maturity of student attitudes toward making career choices in the field of science or mathematics may need to concentrate efforts on helping young people develop self-perceptions within the context of the newly emerging work world.

There are implications in the data that parents should be involved in any focused efforts for career education related to scientific and technological fields. Parents may need to be made fully aware of their influence on the maturity of career choice attitudes of young people about to enter a highly technological work world. They may also need strategies for improving the quality of their influence, such as ways to help adolescents develop mature attitudes about making relevant technological career choices.

In addition, educators interested in promoting mathematical and scientific careers may need to find ways of including significant other people outside of the family unit in the career education process. Such other people should have scientific and/or technological expertise and be promoted as mentors for young people. In a mentor relationship, such significant other

people could make concerted efforts to facilitate the maturity of scientific/technological career choice attitudes among high school students.

Finally, while educators can do little to actually influence socioeconomic status, they may need to be aware of the impact of this variable on the maturity of career choice attitudes. In those instances where socioeconomic status may act to inhibit the development of mature attitudes about making technological or scientific career choices, educators may need to ensure that intervention strategies offset any debilitating effects of social class membership.

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Table 1

Means and Standard Deviations for Independent and Dependent Variables--

Total Group (N=147)

Variable	N	Mean	SD
Self-esteem	147	19.67	6.99
Socioeconomic Status	147	69.23	18.51
Parental Influence	147	96.32	6.68
Mentor Influence	147	81.90	35.13
Career Maturity (Dependent Variable)	147	35.44	4.53

Table 2

Intercorrelation of Variables--Total Group (N=147)

Variable Number-Name	1	2	3	4	5
1. Self-esteem		.15	.09	-.01	.36**
2. Parental Influence			.08	.26**	.16*
3. Mentor Influence				-.03	-.001
4. Socioeconomic Status					.008
5. Career Maturity (Dependent Variable)					

*p<.05
**p<.01

Table 3

Summary of Stepwise Regression Analysis of Career

Maturity Scores on Four Independent Variables (N=147)

Predictor	R	R^2	F-ratio	r[a]
Self-esteem	.357	.1279	21.3**	.357
Parental Influence	.373	.1393	11.7**	.161
Socioeconomic Status	.374	.1396	7.7**	.008
Mentor Influence	.376	.1414	5.8**	-.001

**p<.01

[a]Zero-order correlation coefficient between each independent variable and the dependent variable

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