

THE RELATIONSHIP OF SELECTED VARIABLES TO
CAREER MATURITY INVENTORY SCORES

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CHAPTER I

INTRODUCTION

Theoretical Framework

Vocational choice theory has changed from an early emphasis on matching the right person to the right job when employment became necessary to contemporary theories which embody the concept of career development as a lifelong process concerned with developing attitudes, values, and skills relative to the world of work (Bailey and Stadt, 1973). Reflecting this change, John O. Crites developed a model of career maturity in adolescence to describe an adolescent's development and readiness for decision making with respect to the career process. Crites (1973a, p. 5) gives a developmental framework central importance in his model, writing that career behavior "matures for most individuals as they progress from late childhood through adolescence to early adulthood."

In addition to assuming a developmental nature, Crites' model of career maturity in adolescence is hierarchical, consisting of three levels as shown in Figure 1. The lowest and most specific level, Variables, contains variables which hold major positions in contemporary vocational development theory and which theoretically are most likely to mature during adolescent years (Crites, 1974a).

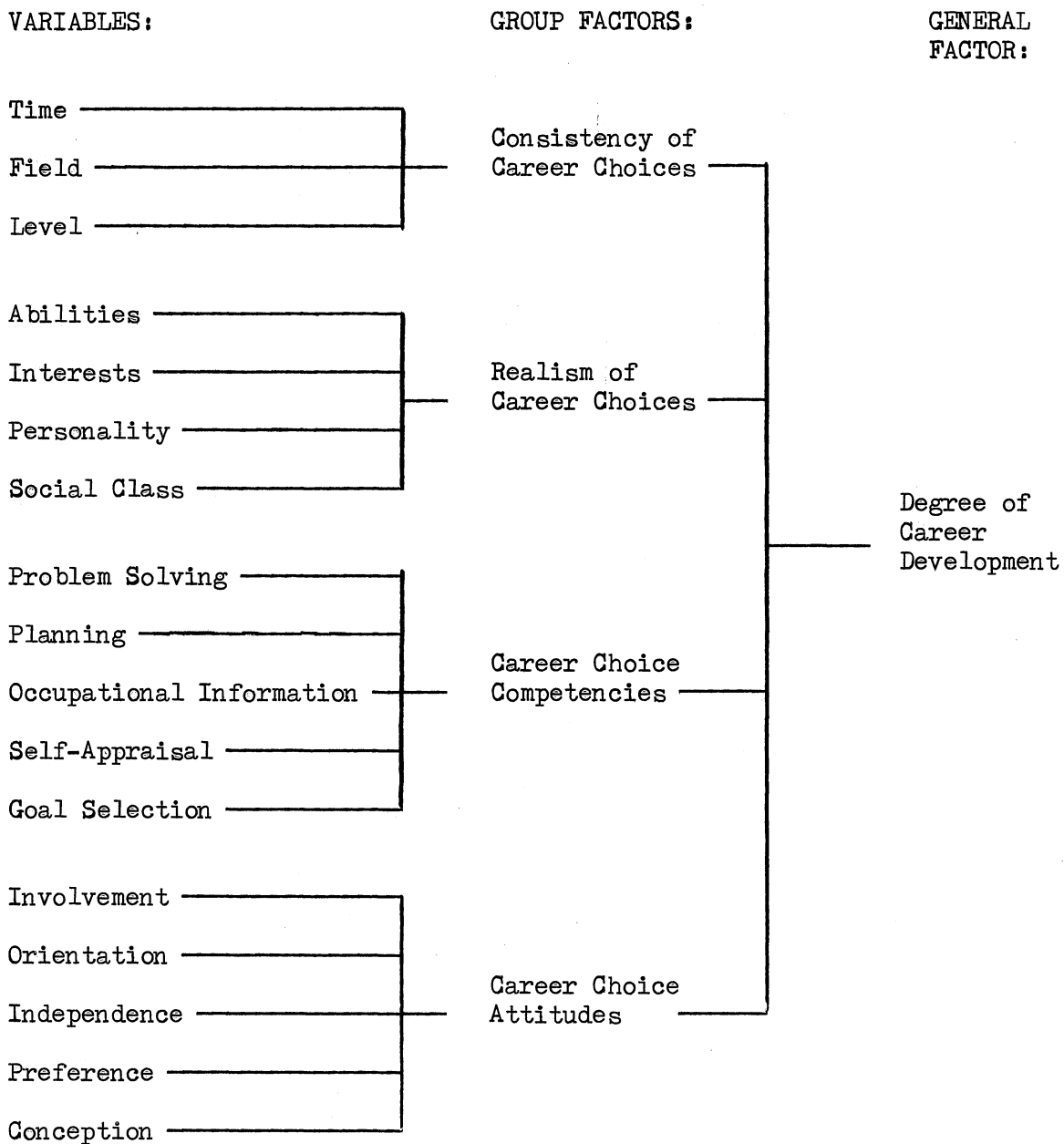


Figure 1. A Model of Career Maturity in Adolescence (Crites, 1973a)

At the second level in Crites' model, Group Factors, are four dimensions which represent clusters of factors built upon relationships of the variables from the lower level. Crites suggests that correlations between these Group Factors should lie in the .30's and .40's (1974a) and the correlations within these clusters in the .50's and .60's (1974b). Westbrook (1976), with a sample of 270 ninth-grade pupils, found correlations slightly higher than Crites' predictions. For example, when correlating a measure of Career Choice Attitudes with measures of the five Career Choice Competencies, Westbrook found correlations from .43 to .52. When correlating the attitude factor with a single competence factor measure, Westbrook obtained a correlation of .56. Within the competence factor Westbrook found eight of ten intercorrelations of the five variables in the .60's, one in the .50's, and one in the .70's. Again, these results were higher than Crites' model predictions.

One cluster at the Group Factor level is called Consistency of Career Choices. This factor deals with the similarity of an individual's vocational choices stated on two or more occasions with respect to field and/or level over a specified time interval (Crites, 1974a).

Another cluster at the Group Factor level is called Realism of Career Choices. This factor deals with the similarity of an individual's characteristics such as interests and abilities with the characteristics requisite for success and satisfaction in the career choice of preference stated by the individual (Crites, 1974a).

An additional cluster at the Group Factor level in Crites' model (1974a, p. 304) is called Career Choice Competencies. This factor generally deals with "comprehension and problem solving abilities as they

pertain to the vocational choice process." Specifically, this factor includes the ability to solve problems which occur in preparation for entry into the world of work, the ability to identify the order of steps in planning a career, knowledge about the world of work, the ability to relate self to work, and the ability to accurately appraise career relevant capabilities (Crites, 1973a).

The remaining cluster of the Group Factor level is called Career Choice Attitudes. This is made up of the "conceptual or dispositional response tendencies in vocational maturity which are nonintellective in nature, but which may mediate both choice consistency and realism as well as choice competencies" (Crites, 1974a, p. 305). This cluster specifically deals with active participation in choice making, pleasure or task orientation toward work, reliance on others in the choice of an occupation and accuracy of conceptions about making a career choice (Crites, 1973a).

The highest and most inclusive level in Crites' model, General Factor, is the Degree of Career Development, which represents an overall level of progress toward career maturity within a given period. A moderate positive correlation between this level and each of the four clusters at the group factor level is hypothesized by Crites (1974b), although he does not numerically estimate this correlation.

To help operationalize his concept of career maturity, Crites (1973b) developed the Career Maturity Inventory (CMI). On the assumption that adequate measures of two of the group factors--Consistency of Career Choices and Realism of Career Choices--already exist, Crites (1973a) constructed the CMI to emphasize the remaining clusters in its two major divisions, the Competence Test (containing five subscales

measuring the five variables of the Career Choice Competencies cluster) and the Attitude Scale (consisting of one test measuring the five variables of the Career Choice Attitudes cluster).

Statement of the Problem

Emphasis on career education in the public schools has resulted in increased use of the CMI as a diagnostic and evaluative instrument. However, the CMI is relatively new, and more relationships between the parts of the inventory and other variables need to be discovered and examined to enhance the understanding and appropriate use of the instrument.

The purpose of this study was to increase the information base for the CMI. First, the CMI was examined for sensitivity to the degree of congruence between profiles of inventoried interests, experiences, and perceived abilities for selected ninth-grade students. Second, a short career education unit which incorporated much of the theoretical framework of Crites' model of career maturity was developed and administered. The relationship between exposure to this career education unit and CMI scores was investigated.

Hypotheses

This study was concerned with ten variables. One independent variable was categorical and involved exposure to a ten-day career education unit as treatment versus nonexposure to the unit as control. The remaining three independent variables were congruence between inventoried interests and manifest interests, congruence between inventoried interests and perceived ability, and congruence between

manifest interests and perceived ability. Each of the three types of congruence was measured by Spearman rank correlation coefficients (ρ). The fifth through tenth variables, the dependent variables, were scores on the six parts of the CMI.

For each CMI scale two categories of hypotheses were made. The first category consisted of hypotheses about the correlation between the CMI scale and the degree of the three congruence types, or ρ 's. Hypotheses of this category allowed examination of the ρ -CMI relationships.

The second category consisted of hypotheses related to the contributions of ρ variables, treatment, and $\rho \times$ treatment interactions to variance in CMI scores. Via multiple regression analysis, hypotheses in this category made it possible to develop regression equations whose predictors were found to be significant contributors to CMI variance and further made it possible to test R^2 , the correlation between CMI scores predicted from the regression equation and the actual CMI scores, for significance. In this category were hypotheses concerning the effect of the treatment, with all other variables removed (if not significant at the .05 level) or controlled (if significant at the .05 level).

Research Hypotheses of Category I

$H_a : \rho_{kj} > 0$ where ρ_{kj} is the product moment correlation between the k th ρ and the j th CMI subscale ($\alpha = .05$).

Research Hypotheses of Category II

$H_a : b_1 \neq 0$ where b_1 is the i th unstandardized partial regression coefficient in the equation $\text{CMI}' = a + b_1 X_1 + \dots + b_n X_n$. In this equation, CMI' represents the predicted CMI score and X represents a main effect variable or a two-way interaction variable between a rho variable and the treatment variable. This test on b_1 is equivalent to testing the standardized regression coefficient, β_i , which is the partial correlation of the i th term with the CMI subscale ($\alpha = .05$). These hypotheses related to the multiple regression equation allow for testing the effect of the rho variables, the treatment variable, and the rho x treatment interactions on the CMI subscale.

$H_a : R^2 > 0$ where R^2 is the multiple correlation coefficient between CMI scores and a linear combination of predictor variables.

Definitions of Terms

1. Inventoried Interest--one's assessed preference for a large number of similar activities. Inventoried interests were operationally defined by Kuder General Interest Survey (GIS), Form E, score profiles (Kuder, 1964), which include measurements in the following ten areas: outdoor, mechanical, computational, scientific, persuasive, artistic, literary, musical, social service, and clerical.

2. Manifest Interest--one's recurring participation in an activity or occupation. Manifest interest was operationally defined by score profiles on Ewens' (1956a) Activity Experience Inventory, AEI. The AEI profiles contain measurements in the same ten areas that are included within GIS profiles.

3. Perceived Ability--one's self-rated level of competence.

Perceived ability was operationally defined by a card sort instrument developed by Ewens called the Rating of Perceived Abilities (Appendix B). The Rating of Perceived Abilities deals with the same ten areas covered by the GIS and the AEI.

4. Congruence Type--any of the following three comparisons:

GA--inventoried interests (GIS) with manifest interests (AEI);

GR--inventoried interests (GIS) with ratings of ability; or

AR--manifest interests (AEI) with ratings of ability.

5. Degree of Congruence--the Spearman rank order correlation, rho, between ranks of scores for the two profiles within a congruence type (see Chapter III, p. 44).

6. Career Education Unit (TMT)--a ten-day classroom and library treatment involving self-awareness, the relationship of personality to jobs, work characteristics, reasons for working, planning for goals, and exploration of occupational information (Appendix C).

7. Career Maturity--one's level of development in relation to Crites' model of career maturity. Career maturity was operationally defined by the six subscales of the CMI.

Rationale for Hypotheses

Preceding a summary of theory and research related to this investigation, a brief discussion of the rationale behind its hypotheses is in order. First, that the career education unit should increase CMI scores is an assumption based on the inclusion of a number of the elements of Crites' career maturity model in the unit. For example, the importance of considering one's interests and abilities, planning,

seeking occupational information, self-appraisal, and active involvement in the career development process are several factors in Crites' model which were emphasized in the unit.

Second, with a summary of vocational theories and actual research data, Nugent (1961, 1962) provided rationale for the assumption that congruence between interest and ability is positively related to career maturity. Based on a study of ninth- and eleventh-grade students classified as having either high or low levels of congruence between interests and abilities, Nugent (1961, p. 391) wrote:

. . . congruent groups could be described as tending to be realistic, resourceful, and productive with indications of good judgment, a sense of well being, and self-understanding. In comparison, discrepant groups tended toward more constricted thought, inefficient use of resources, self-doubt, and unrealism.

The decision to relate profiles of interests to profiles of aptitudes rather than single interests to aptitudes stemmed from a lack of consistent research results for studies which attempted to correlate single interests with single aptitudes (Miller, 1971). Ewens, however, offered evidence that the relationship between interests and aptitudes could profitably be studied by examining the respective profiles (1956a, 1963, 1975). More specifically, Ewens provided data analyses which suggested relationships between manifest interest profiles and inventoried interest profiles (1956b), between manifest interest profiles and aptitude profiles (1963), and between manifest interest profiles and perceived ability profiles (1975). Thus the rationale for conducting this study in terms of interest profiles, both manifest and inventoried, and perceived ability profiles was found in research.

CHAPTER II

REVIEW OF LITERATURE

Developmental Models of Occupational Choice

To help place career maturity in conceptual perspective, an explanation of several occupational choice theories which emphasize a developmental approach will be presented. The following discussions of three models should provide the reader with a general impression of the type of framework on which career maturity is measured. The models were selected because of their wide usage and developmental nature.

Super et al. (1957) propose five vocational life stages as follows:

1. **Growth State (birth-14).** Self-concept develops through identification with key figures in family and in school; needs and fantasy are dominant early in this stage; interest and capacity become more important in this stage with increasing social participation and reality-testing. Substages of the growth stage are:
 - a. **Fantasy (4-10).** Needs are dominant; role-playing is important.
 - b. **Interest (11-12).** Likes are the major determinant of aspirations and activities.
 - c. **Capacity (13-14).** Abilities are given more weight, and job requirements (including training) are considered.
2. **Exploration State (age 15-24).** Self-examination, role tryouts, and occupational exploration take place in school, leisure activities and part-time work. Substages of the exploration stage are:
 - a. **Tentative (15-17).** Needs, interests, capacities, values, and opportunities are all considered. Tentative choices are made and tried out in fantasy, discussion, courses, work, etc.

- b. Transition (18-21). Reality considerations are given more weight as the youth enters the labor market or professional training and attempts to implement a self-concept.
 - c. Trial (22-24). A seemingly appropriate field having been located, a beginning job in it is found and is tried out as a life work.
3. Establishment Stage (age 25-44). Having found an appropriate field, effort is put forth to make a permanent place in it. There may be some trial early in this stage, with consequent shifting, but establishment may begin without trial, especially in the professions. Substages of the establishment stage are:
 - a. Trial (25-30). The field of work presumed to be suitable may prove unsatisfactory, resulting in one or two changes before the life work is found or before it becomes clear that the life work will be a succession of unrelated jobs.
 - b. Stabilization (31-44). As the career pattern becomes clear, effort is put forth to stabilize, to make a secure place, in the world of work. For most persons these are the creative years.
 4. Maintenance Stage (age 45-64). Having made a place in the world of work, the concern is now to hold it. Little new ground is broken, but there is continuation along established lines.
 5. Decline Stage (age 65 on). As physical and mental powers decline, work activity changes and in due course ceases. New roles must be developed, first that of selective participant and then that of observer rather than participant. Substages of this stage are:
 - a. Deceleration (65-70). Sometimes at the time of official retirement, sometimes late in the maintenance stage, the pace of work slackens, duties are shifted, or the nature of the work is changed to suit declining capacities. Many men find part-time jobs to replace their full-time occupations.
 - b. Retirement (71 on). As with all specified age limits, there are great variations from person to person. But, complete cessation of occupations comes for all in due course, to some easily and pleasantly, to others with difficulty and disappointment, and to some only with death (pp. 40-41).

Career development is postulated by Super as a continuous process during which occupational choices are based on a synthesis of a person's needs, resources and social demands. Role playing and role taking enable the person to learn about himself in relation to his situation, and the person attempts to match his self-concept with his concept of

available career options. Rather than emphasizing a matching of a person with a type of job at a given time, Super emphasizes a process through which a person matures which will result in a compatible occupational choice.

Ginzberg, Ginsberg, Axelrad and Herma (1951) approach career choice as a developmental process divided into stages and substages, as Super does. Ginzberg (1972) later allows for reverses within the stage process in the sense that one may regress to an earlier stage, although during this reversal one cannot nullify experience which led to the later stage. The career development process outlined by Ginzberg involves a series of compromises between what the individual wants, his opportunities, and his limitations--with the decision-making ability of the person centrally involved in the person's attempts to optimize his situation. Ginzberg's theory does not intend to lead to the prediction of one's occupation, but it allows prediction of the relevant career development behavior a person within a stage will engage in--as each stage in the sequence presents particular situations to cope with and make decisions about.

In accordance with his own scheme of development tasks (1953, 1972), Havighurst (1964) proposes the following stages in the lifelong process of vocational development:

1. Identification with a Worker (ages 5-10)
 Father, mother, other significant persons.
 The concept of working becomes an essential part of the ego-ideal.
2. Acquiring the Basic Habits of Industry (ages 10-15)
 Learning to organize one's time and energy to get a piece of work done.
 School work, chores.

3. Acquiring Identity as a Worker in the Occupational Structure (ages 15-25)
 Choosing and preparing for an occupation.
 Getting work experience as a basis for occupational choice and for assurance of economic independence.
4. Becoming a Productive Person (ages 25-40)
 Mastering the skills of one's occupation.
 Moving up the ladder within one's occupation.
5. Maintaining a Productive Society (ages 40-70)
 Emphasis shifts toward the societal and away from the individual aspect of the worker's role. The individual sees himself as a responsible citizen in a productive society. He pays attention to the civic responsibility attached to his job. He is at the peak of his occupational career and his time and energy to adorn it with broader types of activity. He pays attention to inducting younger people into stages 3 and 4.
6. Contemplating a Productive and Responsible Life (age 70+)
 This person is retired from his work or is in process of withdrawing from the worker's role. He looks back over his work life with satisfaction, sees that he has made his social contribution, and is pleased with it. While he may not have achieved all of his ambition, he accepts his life and believes in himself as a productive person (p. 116).

Components of Career Maturity

Within the framework of developmental models of the occupational choice process, the concept of career maturity has merged to indicate the level an individual has attained on a vocational development continuum. For example, career maturity (originally called vocational maturity) was first used by Super (1955, p. 153) to indicate "the place reached (by an individual) on the continuum from exploration to decline."

Early work in the area of career maturity was conducted through the Career Pattern Study, CPS, later described by Super (1974) as a project developed to emphasize the definition, assessment, and

development of vocational maturity. Super (p. 12) continued, explaining that the results of the CPS were built upon the following assumptions:

1. Development proceeds from random, undifferentiated activity to goal directed, specific activity.
2. Development is in the direction of increasing awareness and orientation to reality.
3. Development is from dependence to increasing independence.
4. The mature individual selects a goal.
5. The mature individual's behavior is goal directed.

With the above assumptions and a review of relevant literature as a guide, Super and Overstreet (1960) developed an early model of vocational maturity in ninth-grade boys consisting of six dimensions subsuming twenty indices (Figure 2). After examination of score data on this early model, Super and Overstreet offered several observations concerning its appropriateness for boys in the ninth grade. First, after research, several of the indices proposed in the model were judged to have no relationship to the interrelated indices which best appeared to reflect career maturity. Generally, the usefulness of the dimensions Consistency of Vocational Preference, Crystallization of Traits, Vocational Independence, and Wisdom of Vocational Preference as components of vocational maturity in ninth-grade boys was questioned. Second, those indices which Super and Overstreet concluded were appropriate for vocationally mature behavior at the ninth-grade level were grouped under two new dimensions: Orientation to Vocational Choice Tasks and The Use of Resources.

- Dimension I. Orientation to Vocational Choice
 - IA. Concern with Choice
 - IB. Use of Resources
- Dimension II. Information and Planning
 - IIA. Specificity of Information
 - IIB. Specificity of Planning
 - IIC. Extent of Planning Activity
- Dimension III. Consistency of Vocational Preference
 - IIIA. Consistency within Fields
 - IIIB. Consistency within Levels
 - IIIC. Consistency within Families
- Dimension IV. Crystallization of Traits
 - IVA. Patterning of Interests
 - IVB. Interest Maturity
 - IVC. Liking for Work
 - IVD. Patterning of Work Values
 - IVE. Discussion of Rewards of Work
 - IVF. Acceptance of Responsibility
- Dimension V. Vocational Independence
 - VA. Independence of Work Experience
- Dimension VI. Wisdom of Vocational Preferences
 - VIA. Agreement: Ability and Preference
 - VIB. Agreement: Interest and Preference
 - VIC. Agreement: Interests and Fantasy Preferences
 - VID. Agreement: Level of Interests and Preference
 - VIE. Socioeconomic Accessibility

Figure 2. Super and Overstreet's Early CPS Model of Vocational Maturity in Ninth-Grade Boys

The new Orientation to Vocational Choice Tasks dimension consisted of the following indices from the early CPS model: Concern With Choice (IA), Acceptance of Responsibility for Choice and Planning (IVF), Specificity of Information about the Preferred Occupation (IIA), and Specificity of Planning for the Preferred Occupation (a combination of IIB and IIC) (Super and Overstreet, 1960).

An examination of the techniques used to assess the indices included in the Orientation to Vocational Choice Tasks dimension indicates that it is concerned with the present and future necessity to make prevocational and vocational choices, knowledge of factors to consider in making a choice, and awareness of events which might upset one's plans. Also, accepting responsibility for choosing and planning, particularly with the help of informed persons, is included in this dimension. Finally, the dimension includes having information about and plans for training and entering one's occupational preference (Super and Overstreet, 1960).

Super and Overstreet's second new dimension, Use of Resources, is made up of one index from the earlier CPS model, Use of Resources in Education (IB). This dimension is described as broadly consisting of the use of any resource (for example, informed others, observation of occupations, participation in related activities, part-time jobs, and printed literature) for information about one's plans and more generally for orientation to the world of work.

A summary of the nature of vocational maturity of boys in the ninth grade is given by Super and Overstreet (1960). It reads:

. . . it appears to consist of behavior which might be characterized as preparation for vocational choice, or orientation attitudes and activities. It is behavior in which the subject looks ahead, considers what the future may hold for him, and engages in thinking, planning, and actions which may help him meet the future. The important aspect is that the individual recognizes the eventual need for goals and the desirability of developing them. According to our data, vocational maturity in the ninth grade does not appear to involve having consistent or realistic vocational preferences, having clear-cut interests or work values, or having had independent work experience. It is not, at this stage, characterized by preferences which are consistent with each other or with the realities of the self or of the occupational world, or by any initial achievement of a place for oneself in the working world. Vocational maturity in ninth-grade boys is shown, not by where they have arrived vocationally, but by how they are thinking about goals and what they are doing about them (p. 63).

The above findings were subjected by Super to factor analysis, and a representative model detailed in Figure 3 was formed. This later model contained four factors: Planning Orientation (a general factor), The Long View Ahead, The Intermediate View Ahead, and the Short View Ahead (1974, pp. 13-14).

Crites built on the CPS research to develop the model for vocational maturity in adolescence presented in Chapter I. The Crites model, like the CPS models, is based on a developmental life stage framework. However, rather than comparing adolescents to their immediate peers, as do the CPS models, Crites' measurement of career maturity is made by comparing an individual with the oldest individual in the same life stage. Thus, if a ninth-grader responds to a career maturity item as twelfth-graders normally respond to the item, the ninth-grader's response is considered vocationally mature (Crites, 1961).

Factor I. Planning Orientation

- A. Acceptance of Responsibility
- B. Specificity of Information (more immediate types)
- C. Specificity of Planning
- D. Steps Taken to Obtain Information
- E. Awareness of the Need for Choices

Factor II. The Long View Ahead

- A. Awareness of the Need for Ultimate Choices
- B. Specificity of Information (remoter types)
- C. Entry Planning
- D. Awareness of Factors in Choice
- E. Awareness of Contingency Factors
- F. Acceptance of Responsibility

Factor III. The Short View Ahead

- A. Specificity of Planning
- B. Awareness of the Need for Immediate Choices
- C. Acceptance of Responsibility for Choice
- D. Steps Taken to Obtain Information for High School

Factor IV. The Intermediate View

- A. Awareness of Factors in Choice
- B. Awareness of need for Intermediate Choice
- C. Specificity of Post-High School Plans
- D. Awareness of Contingency Factors

Figure 3. Super's Factor Analytic Model of Vocational Maturity in Ninth-Grade Boys

A comparison of the Crites' model with the CPS models reveals many similar variables--as mentioned earlier, Crites feels the measurements developed within the CPS program were sufficient for the components of two of his four group factors. Super (1974, p. 12) contends that the "important contribution of the [Crites] model is the distinction between cognitive and attitudinal variables, and the clarity with which the figure depicts them."

Problems Related to Career Maturity Theory

Harmon (1974, p. 84) presents four assumptions which are commonly made in regard to vocational development theories and then gives arguments which question the validity of the assumptions. The common assumptions are that:

Vocation is an important organizing force in human life; individuals have some control over the choices they are offered; the process of acquiring vocational maturity is amenable to intervention by the counselor; and the behavior measured is related to significant non-test behavior.

The first assumption, that one's vocation is an important organizing force in one's life, has been challenged by pointing out that for some people work may mean an unpleasant but necessary effort for food and shelter, or luxuries. That work for some is a rewarding, absorbing task in itself is fine, but is it a lack of maturity to willingly work at a job that is unfulfilling due to conditions one cannot change? The issue raised by this question, Harmon claims, is how vocational maturity is related to working at some of the jobs in our society which are least attractive. In dealing with an assumption similar to that brought up by Harmon, Warnath (1975) says that it

. . . cannot be made unless one holds a prior assumption that every job is capable of engaging the human qualities of an individual and that, in the Protestant tradition, each job has the potential of being a 'calling.' The vocational theorists have reinforced the concept that the job is the primary focus of a person's life. This may have been true during the years of the small farmer and the independent entrepreneur; but under present conditions, where almost all people work for organizations whose survival is dependent on generating profit and operating efficiently, the needs of the individual are subordinated to the goals of the organization (p. 422).

The second assumption challenged by Harmon is that people are actually offered choices for which vocational maturity is needed. If choices for some individuals such as women, blacks, and the poor are limited by social forces beyond the person's control, then no matter how much career maturity a person has, the choice limitation is a serious consideration. Harmon points out that in this case more attention to the labor market structure than to the individual's ability to make choice decisions might be appropriate. Stubbins (1973) brings Harmon's point on target when he writes

The vocational psychologist operates in a world that economics and political science have long since discarded--a perspective that ignores the fact that the [person's] world has already taught him that socio-economic status, racial origin, and power are more determinative than aptitude or interests (p. 24).

Related to the issue of an individual's control over his vocational choices, several strong arguments about the negative influence of social forces have been made. LoCascio (1974) directs his attention to the charge that vocational development theories tend to emphasize continuity of vocational development when, in fact, vocational development of the poor may be discontinuous. He argues that the generally accepted vocational development tasks from theories have not been empirically validated for all socio-economic situations. LoCascio continues that

society may in reality be more concerned that individuals work gainfully than that they crystallize and specify an occupational preference before implementing it, and that for the poor the vocational developmental task is "to get a job, any job, right away in order to help meet the urgent economic needs of the family" (p. 125).

Concerning the CMI several questions can be raised with regard to the effects of social forces. One limitation appertains to the development and standardization of the instrument. For the Attitude Scale of the CMI the initial pool of 1,000 items was based mainly on attitudinal statements made by clients during career counseling, but neither the characteristics of the clients nor the procedures for selecting the statements or clients were described. Moreover, one may question the validity of a pool of items principally drawn from those seeking counseling. Regarding Crites' exclusive use of twelfth-graders from one Cedar Rapids high school only as the criterion group representing the most advanced group in the relevant life stage, a point can be made that by grade twelve a disproportionate number of the poor and minorities may have dropped out (LoCascio, 1974). Crites (1965, p. 10) himself concludes that ". . . the senior high school data may be somewhat biased"

Samuda (1975) presents strong arguments showing the problems associated with using standardized tests with minorities. Although Samuda's discussion does not deal specifically with the CMI, the points he makes are relevant. For example, if the twelfth-graders used as a model for vocational maturity by Crites were predominantly middle class, then use of the CMI to characterize dissimilar groups as less vocationally mature because of low CMI scores could be inappropriate.

LoCoscio (1974) accentuates the nature of this possible problem by commenting that if the Cedar Rapids twelfth-graders had been given an instrument developed in black Washington, D.C., the Iowans are likely to appear less vocationally mature than the standardization sample.

Several recent studies have examined the relationship between social factors and CMI scores. For example, Lawrence and Brown (1976) found that race and sex, and to a lesser extent socio-economic status, relate to CMI scores. Using a sample of black sixth-grade males, Dillard (1976) found significant Attitude Scale differences between a group of urban lower-class subjects and a group of urban and suburban middle-class subjects. One may note that in both of the above studies, the authors felt the results imply that different career development practices need to be considered by counselors when dealing with particular social subgroups. Neither researcher chose to seriously challenge the model the CMI was built upon as being invalid for the subgroups.

Returning to Harmon's questionable assumptions, when one considers the third assumption that the developmental process underlying vocational maturity is amenable to counseling intervention one finds an assortment of research results. The following discussion results from a survey of literature involving CMI scores and some type of intervention.

Crites (1973a) reports several early studies involving the Attitude Scale and experimental variables. For example, Asbury (1967) found a counseling and Attitude Scale pretest interaction indicating that counseling with disadvantaged eighth-graders had a significant effect on Attitude Scale scores when preceded by administration of the Attitude Scale. Several other early studies (Bovee, 1967; Gilliland,

1966; and Goodson, 1969) found Attitude Scale improvements following counselor intervention. On the other hand, from the beginning there have been studies which did not obtain increases in Attitude Scale scores following treatment. Two such studies, one by Guerriero (1967) and another by Myers (1966) found the "intensive vocational counseling" and participation in a Neighborhood Youth Project, respectively, had no significant effect on the maturity of vocational attitudes as measured by the CMI. Other early studies by Williams (1967) and by Carey (1965) found individual and group counseling ineffective in producing increases in Attitude Scale scores.

The issue of career maturity's sensitivity to counseling intervention was unsettled a decade ago, and still research fails to answer the question consistently, as illustrated by the following review of recent studies. Hamdani (1977), using a sample of tenth-graders in an inner-city school, found that a daily class period (approximately 100 hours total) designed to increase self and occupational knowledge, develop positive work attitudes, increase decision-making skills, develop job seeking skills and promote regular school attendance was followed by significantly higher post-test scores on the Attitude Scale--and these higher scores were re-obtained on a follow-up study four months later. Unfortunately, in Hamdani's study no control group was involved to control for ordinary maturation. Biscoglio (1975) found that with eleventh-graders, exposure to Decisions and Outcomes material by Gelatt et al. had no significant effect on post-test of any of the CMI's six scales. Pyle (1976), used the Attitude Scale to measure the effect of exposure to Educational Testing Service's computer based program called System of Interactive Guidance and

Information on community college students and found significant increases in Attitude Scale scores. However, he found no significant Attitude Scale score increases following exposure to a group counseling activity. In a study using eighth and ninth-graders from a suburban junior high school Trainor (1976) found--following an Attitude Scale pretest, administration and interpretation of the Kuder General Interest Survey, and use of Science Research Associates' Occupational Exploration Kit--that the ninth-graders showed a significant Attitude Scale increase while the eighth-graders did not.

In a study using all CMI scales as criteria, Omvig, Tulloch and Thomas (1975) found that a career education workshop attended by sixth and eighth-grade teachers and implemented in the classroom the following year resulted in significant increases for experimental sixth-graders over controls on the Occupational Information and Planning scales. For eighth-graders, the experimental subjects scored significantly higher on the Planning and Attitude scales.

Using tenth-grade students whose Attitude + Self-Appraisal total was below the mean when compared to their classmates, Flake, Roach and Stenning (1975) found experimental group means increased significantly on Attitude Scale and Attitude + Self-Appraisal, but not on Self-Appraisal alone. The treatment in this study involved three sessions over a six-week period which included a 30-minute individual counseling session explaining the program and discussing the students' plans, a one-day administration and interpretation of the Gordon Occupational Checklist and General Aptitude Test Battery, and a 45-60 minute individual counseling session in which immature pretest CMI responses were reviewed with the counselee.

The final debatable assumption presented by Harmon relates to a lack of predictive validity for the various vocational maturity instruments. The assumption is that measured vocational maturity is related to real life behavior, and the problem is that predictive validity for relevant criterion behaviors is sparse. Cognizance of principles does not guarantee their application in actual life--the person who knows appropriate study skills does not automatically apply them, nor is one who passes a first aid achievement test immune to panic in a real emergency. Will two people who score the same on the CMI behave in approximately similar ways? In this respect, compare a female and male with similar scores of vocational maturity. Notwithstanding contemporary increases, women are still under-represented in top business management positions, professions and politics (Loeb, 1976). Richardson (1974) discusses some of the implications of sex role on women's vocational development, which often prescribes an employment pattern delimited by marriage and children. Also, the lack of predictive validity of vocational maturity measures for women is closely related to the first two assumptions Harmon questions. First, because of social pressures toward marriage and family devotion, a vocation may not be an organizing force in many women's lives; and second, many women (no matter how vocationally mature) may face a limited number of choices due to restrictions resulting from sex role stereotyping. Any career maturity instrument based on a continuous vocational development process needs examination in regard to its appropriateness for women whose vocational development is interrupted by marriage and family. Richardson (1974, p. 37) writes

A model of vocational maturity and career development that would fit women would need to modify the definitions of the stages to attach more importance to exploration and establishment in the traditional aspect of the adult female role--that of wife and mother.

Adjustment and Interest-Aptitude Accordance

Nugent (1961, p. 388) presents a review of literature supporting his hypothesis that there is a "relationship between the coincidence of a person's vocational interests and aptitudes and certain aspects of his adjustment." In his own research study, Nugent (1961) obtained measurements of each subject's total discrepancy between three corresponding interest-aptitude categories: Kuder Clerical and DAT Clerical, Kuder Mechanical and DAT Mechanical, and Kuder Computational and DAT Numerical Ability. The study consisted of a comparison of groups of students categorized as low interest-aptitude discrepancy with groups of students categorized as high interest-aptitude discrepancy. Using the California Psychological Inventory (CPI) as an indicator of personal adjustment, Nugent found that for ninth-graders the students with low discrepancies between aptitudes and interests scored significantly higher on the following CPI scales: sense of well being, communality, intellectual efficiency and flexibility. For eleventh-graders similar results were obtained on the CPI scales: sense of well-being, self-control, tolerance, communality, achievement via conformance, intellectual efficiency and socialization.

Borrowing from Nugent's review of literature, the following quotations are used to validate further investigation of the interest-aptitude and adjustment relationship:

. . . the individual derives satisfaction from the identification of himself with some respected group This identification leads to an interest in restricted activities and experiences. . . . As long as no great discrepancies are felt between ability and the requirement of the vocation, the individual persists with the identification . . . when insurmountable obstacles are encountered the whole process of identification and the whole pattern of adjustment are likely to be disrupted (Carter, 1940, p. 186).

The satisfaction which is derived from the rewarded use of abilities, the approved meeting of needs, the accepted manifestations of interests, and the social realization of values channelizes personal resources The result is then an integrated person . . . incompatible needs and values may be rewarded, and aptitudes may be developed which may be exercised with approval in some contexts but not in others. The result is a poorly integrated person (Super, 1956, p. 252).

Concerning Carter's and Super's work, Nugent concludes that both authors agree that the degree of congruence between what a person is motivated to do (interests) and what he is capable of doing (aptitudes) is reflected in one's adjustment. Nugent (1962) proceeds to the following assumption:

The extent of congruence between an individual's interests and aptitudes is an index of his adjustment. To elaborate, a person with similarities between aptitude and interest should have a better feeling of well-being, more self insight, and should be making more effective use of his resources (aptitudes) to satisfy his needs (interests), than a person with incongruencies between interest and aptitude (p. 525).

Drawing from a review of relevant interest and psychological theories, empirical observations of counselors, and his own pilot study, Nugent supports the above assumption.

Recently, Ewens, Dobson and Seals (1976) presented the behavioristic theory of career development which makes the following postulates concerning aptitude and interests:

1. 'All behavior, without exception, is a function of the behavior's perceptual field at the instant of behaving' (Combs, 1956).
2. Activities (behavior resulting from reaction to the perceptual field) which result in success experiences tend to induce the development of interests which in turn cause the individual, in the future, to choose similar activities from available options.
3. Persons tend to accumulate large amounts of experience in those activities in which they have the greatest interest. The development of competencies relative to the skills needed for success in the activities results from the involvement in the activities. The developing concept of some degree of perceived ability for the activity is a reflection of the success experiences.
4. When a person's environment (the perceptual field) offers more than one activity option, the person is more likely to select the activity of greatest interest, the one that offers the greatest possibility of success and most likely to satisfy perceived needs. The person will avoid if possible, those activities which are perceived as probably failure or unpleasant experiences.
5. The person's environment, which for some is quite limited, provides the opportunities for experiences and, therefore, becomes a strong factor in the development of interests and competencies (p. 18).

From the above postulates one may conclude that in the normal process of career maturation an intertwining of one's interests (especially one's manifest interests as reflected by selective participation in activities) and one's abilities (especially the perceptions of one's abilities one gains by being successful or unsuccessful in various activities) exists.

Crites (1973a) proposes the model shown in Figure 4 to represent the relationship of career maturity to a person's general adjustment.

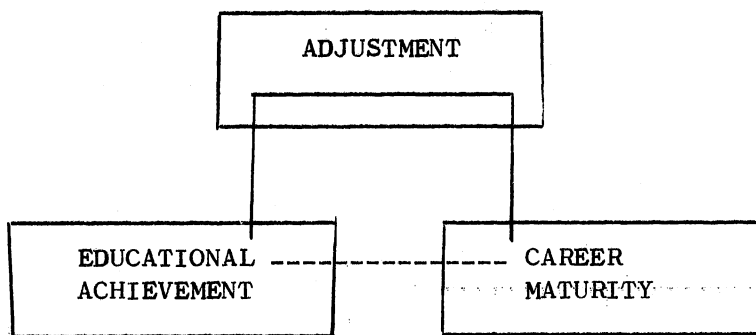


Figure 4. Adjustment as a General Dimension of Development in Relation to Educational Achievement and Career Maturity

Based on Super's assumption:

Like social development, emotional development, and intellectual development [career development] has both distinctive characteristics which make focusing on it worthwhile and common characteristics which reveal it as one way in which the general development of the individual manifests itself (1957, p. 185),

the model suggests that both educational development and career maturity are related to adjustment factors as well as to each other (Crites and Semler, 1967).

The above relationship between career maturity and adjustment together with the relationships Nugent (1961, p. 19) proposes between the interest-aptitude interaction and adjustment provide a research link. This link connects career maturity with interest-aptitude congruence via general adjustment. This possible relationship between career maturity and interest-aptitude congruence lies at the center of this study.

Interest-Aptitude Congruence

In the early 1900's the prevailing opinion was that interests and abilities were highly correlated. This viewpoint was supported by the early research theorists who found close relationships between self-related interests and self-related abilities. With the advent of standardized instruments to measure interests and aptitudes the relationship between interests and abilities became questionable, to the extent that after an extensive review of the literature, Miller (1971, p. 356) wrote " . . . if by ability we mean tested ability, and by interest inventoried interests, the accumulated evidence is so overwhelmingly in the negative that there is little to be gained by laboring the point." Similarly, Miller reported a lack of consequential research supporting a simple relationship between interests and grades.

Amid the lack of research support for a significant relationship between inventoried interests and tested aptitudes, Ewens began an alternate approach involving accumulated experiences, or manifest interests, rather than the usual inventoried preference interests. In an early study of the relationship between manifest interests measured by the Activity Experience Inventory and inventoried interests measured by the Kuder Preference Record, Ewens (1966) reported several findings. First, it was observed that males tended to score higher on some categories of the Kuder test and females higher on others. A similar observation was made for the AEI. Furthermore, the male-female pattern formed within the Kuder categories was similar to the male-female pattern within the AEI's corresponding categories. Specifically, on both the Kuder and the AEI males had significantly higher mean scores than females on the mechanical and scientific scales, while females

on both instruments scored significantly higher in the artistic, literary, musical, social services and clerical areas. In the same study, for each interest category the females' AEI and Kuder scores showed significant positive correlations. For males a similar result was obtained with the exception of a non-significant positive relationship between AEI and Kuder clerical scales. For both sexes, the AEI-Kuder correlations between the musical scales, the scientific scales, and the mechanical scales were the highest. Finally, when rho coefficients were used as measures of the similarity of one's AEI profile to one's Kuder profile, the median rho for females was .58 and for males was .48.

In a later study, to illustrate the importance of comparing a person's interests and aptitudes via profiles, Ewens (1963) used the chart presented in Figure 5. The chart shows the profiles of interest and aptitudes for a hypothetical person who has generally low aptitude scores but who has similar patterns for aptitudes and interests.

From Figure 5 one readily sees that the shape or pattern of the person's profiles are similar, with high and low points generally occurring on corresponding subscales of the interest and aptitude profiles. Notice that although the profile shapes are similar, there are large discrepancies between many of the interest scores and their corresponding aptitude scores. Particularly, if one were studying the correlation between aptitude number 4 and interest number 4, the Figure 5 result would not contribute to a high interest-aptitude relationship. Such discrepancies are likely to be found, especially when a forced-choice instrument such as the Kuder is used.

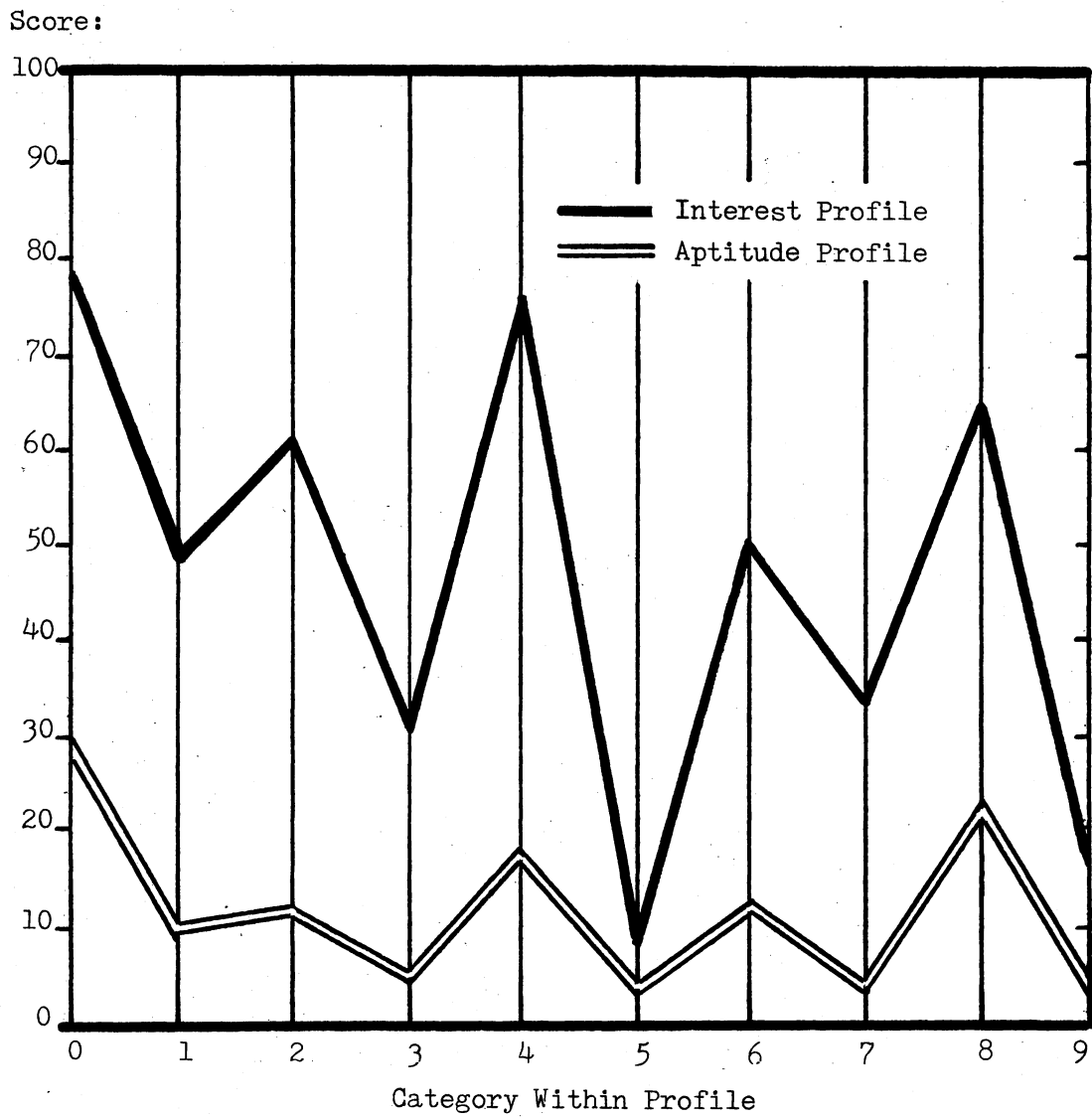


Figure 5. Hypothetical Interest and Aptitude Profiles for John Doe

And, studies which report low correlations between interests and aptitudes often reflect these discrepancies which theoretically can exist within very similar profile patterns (Ewens, 1963).

A third study by Ewens (1975) was concerned with the relationship between profiles of activity experiences and profiles of perceived ability, both profiles again based on the Kuder categories. Using the correlation between the ranked categories on both the AEI and Rating of Perceived Ability as an indicator of the degree of similarity between the profiles, a fairly strong relationship between manifest interests and perceived abilities was found, with median rhos of .62 for ninth-graders, .56 for eleventh-graders, and .66 for college freshmen. Generally Ewens found that the interest-ability relationship was more consistent when only those Kuder categories ranked very high and very low were considered. That is, the areas ranked in the middle range showed more rank-order variation than those areas ranked at either extreme.

CHAPTER III

METHOD AND DESIGN

Subjects

Subjects for this study were 340 ninth-grade students in Stillwater, Oklahoma, a city of approximately 40,000. In addition to several manufacturing companies and an area vocational-technical center serving adults and eleventh and twelfth-grade students from several school districts, Stillwater is the home of a major university, Oklahoma State University.

Stillwater is served by one high school, which enrolls grades nine through twelve. The entire ninth-grade class, with the exception of six students in a special education class for the educable mentally handicapped, participated in this study.

Two months prior to the administration of the criterion measure, Form S of the Differential Aptitude Tests was administered to the ninth-graders. On the DAT the Verbal Reasoning + Numerical Ability score, VR+NA, is often used as an index of general scholastic ability (Bennett, Seashore and Wesman, 1974). For females in the class the mean VR+NA score was 46, which is at the 60th percentile for a national norm group of over 7,000 ninth-grade girls. For males in the class, the mean VR+NA score was 44, which is at the 60th percentile for a national norm group of over 7,350 ninth-grade boys.

Instruments

Kuder General Interest Survey, GIS, Form E

Form E of the GIS is the latest revision of the Kuder Preference Record, Form C. Developed in 1964 by Kuder, the GIS was constructed to be an appropriate measure of interests of students at the junior high school level. Development of the instrument, as well as data which suggests that its reading level is appropriate at the sixth-grade; is discussed in the General Interest Survey Manual (Kuder, 1971).

The GIS consists of 552 statements of activities combined into 184 triads. The test is forced-choice; that is, for each triad the subject is asked to indicate the activity most liked and the activity least liked. Raw scores on the test are converted to national percentiles with respect to grade level and sex.

Rather than expressing the subject's vocational preferences in relation to specific occupations, the GIS indicates preferences in terms of ten clusters: outdoor, mechanical, computational, scientific, persuasive, artistic, literary, musical, social service and clerical. A summary of the research and logic used in the development of the ten scales, as well as reported intercorrelations between the scales ranging from $-.37$ to $.37$ (most close to zero) is presented by Kuder (1971).

Reliability of the GIS. For a subsample of the standardization group, test-retest correlations for ninth through twelfth-graders over a six-week interval ranged from $.78$ to $.91$. And, as an indication of internal consistency, Kuder-Richardson Formula 20 reliabilities for the scales ranged from $.80$ to $.92$ for a subsample of ninth through

twelfth-graders (Kuder, 1971).

Validity of the GIS. Validity data for the GIS unfortunately is limited. Thus, an earlier form of the test, Form C of the Kuder Preference Record, must be summoned to support validity of the GIS. Before this earlier data is summarized, it is meaningful to present correlations of the scales of the earlier tests with the corresponding scales of the GIS. In a study designed for that purpose Kuder reported for tenth-graders that corresponding scales ranged in correlation from .69 to .82 for boys (median .76) and from .65 to .86 for girls (median .79) (Kuder, 1971).

In a 7-10 year follow-up study relating job satisfaction to high school scores on Form C of the Kuder Preference Record, workers were classified according to two dimensions: agreement between interests and work (consistent and inconsistent) and job satisfaction (definitely satisfied, middle and definitely dissatisfied). The study indicated a positive relation of job satisfaction to consistency, with 62 per cent of the consistent group, compared to only 34 per cent of the inconsistent group, being satisfied with their work. And, 25 per cent of the workers in the inconsistent group, compared to eight per cent in the consistent group, were dissatisfied (McRay, 1959). Studies which support the general trend found in the McRay study above, but for specific occupational groups, are summarized by Kuder (1971).

Activity Experience Inventory, AEI

The AEI was developed by Ewens to measure manifest interests through a self-report rating scale of participation in various

activities. The interest categories of the GIS were also used as categories of experiences (manifest interests) to be measured by the AEI. That is, each item on the AEI is a brief description of an activity corresponding to one of the GIS interest categories. Inter-correlations of the scales of the AEI, for a sample of 79 males had a median of .54 and for a sample of 89 females had a median of .53 (Ewens, 1956a). Each of the ten categories on the AEI is represented by 25 items, which were written to be within the probable experience range of high school students and at the high school reading level (Ewens, 1956a).

Originally, the AEI contained only the nine subscales of the Kuder Preference Record, Form BB. The tenth subscale, outdoor, was later added to the AEI by Ewens to allow comparisons with the later forms of the Kuder tests. The reliability and validity data summarized in the following two paragraphs relates to the early form of the AEI.

Reliability of the AEI. Reliability data for the AEI was presented by Ewens (1956a) for a sample of 836 junior and senior high school students. For males in the sample the mean of the odd-even item correlations for all scales was .90, and for females the mean of the scales' odd-even item correlations was .89. In this same study, test-retest reliability coefficients for the scales after six months had a mean of .83 for males and a mean of .73 for females. Further, to examine the stability of the order of the scores in AEI profiles, Ewens converted the scores in the profiles of the test-retest sample mentioned above to rank order, and he found the median rho coefficient for males to be .82 and for females to be .77.

Validity of the AEI. Ewens (1956a) presented several arguments supporting the validity of the AEI. First, its validity was supported by graduate counselor trainees' judgments of the appropriateness of the classification of the experience items into the Kuder interest areas. Also, validity was supported by a mean correlation coefficient of .47 between the scores on the scales of the AEI and independent responses and surveys of school records (Ewens suggested that the moderately low correlations between the AEI and the independent measures of experiences was due in part to the difficulty in classifying many of the experiences found in the independent measures into specific categories). Finally, in relating the AEI to the Strong Vocational Interest Blank, Ewens reported that the inter-correlations of the scales of the AEI were similar to those found for the SVIB.

Rating of Perceived Abilities

The Rating of Perceived Abilities is a card sort instrument used to obtain a rank ordering of a subject's perceived abilities. The Kuder GIS interest categories serve as a framework for the self-rating, with each GIS category being described by a list of several occupations associated with that category. Subjects are asked to rank the categories according to their impression of their ability to perform the type of activities used to describe the categories (Appendix B).

Test-retest reliability for the Rating of Perceived Abilities was examined by Ewens (1975) for 42 eleventh-grade students with a six-month time interval between test administrations. The median rho coefficient for the rank order profiles was .76, and a frequency distribution of the rho values for the subjects showed the highest number of

correlation coefficients in the .90 to .99 range.

Career Maturity Inventory, CMI

The CMI, formerly called the Vocational Development Inventory, has two major parts--the Attitude Scale and the Competence Test. These parts were designed to be consistent with the theoretical framework provided by the Career Choice Attitudes and the Career Choice Competencies group factors in Crites' model of career maturity. A detailed description of the development of the two divisions of the test is available in the Theory and Research Handbook for the CMI (Crites, 1973a).

The Attitude Scale

The Attitude Scale of the CMI consists of 50 true-false items designed to measure five dimensions: involvement in the choice process (the extent to which the individual is actively involved in the process of making a choice), orientation toward work (the extent to which the individual is task or pleasure oriented), independence in decision-making (the extent to which the individual relies upon others in the choice of an occupation), preference for career choice factors (the extent to which the individual bases his choice upon a particular factor), and conceptions of the choice process (the extent to which the individual has accurate conceptions about making a career choice) (Crites, 1973a).

Reliability of the Attitude Scale. Internal consistency and stability data for the Attitude Scale were found as follows: concerning internal consistency the mean of the Kuder-Richardson Formula 20 coefficients for each of the grades six through twelve was .74 (.65 for ninth-graders), and concerning stability a coefficient between test and retest over a one-year interval for subjects in grades six through twelve was .71 (Crites, 1973a).

Validity of the Attitude Scale. In regard to content validity, Crites (1973a, p. 15) discussed evidence that the Attitude Scale "samples content that is theoretically relevant and representative." Then, Crites (1973c) marshaled evidence for criterion-related and construct validity which can be summarized thus: the attitudes measured by the Attitude Scale mature with respect to time and are associated with definiteness of career choice in college students, consistency in choices over time, and making realistic choices. Significant positive correlations were found between the Attitude Scale and measures of intelligence, adjustment, achievement, and success on the job. Crites (1973a) also found evidence that the Attitude Scale is not significantly contaminated by response bias and that counseling can favorably affect Attitude Scale scores.

The Competence Test

The Competence Test section of the CMI consists of five subtests: Knowing Yourself (self-appraisal), which was constructed to assess how well one can appraise one's job-related strengths and weaknesses; Knowing About Jobs (occupational information), which was designed to measure how much one knows about the world of work; Choosing a Job

(goal selection), which was developed to measure how adept one is in matching personal characteristics with occupational requirements; Looking Ahead (planning), which was designed to assess one's foresightedness in the steps of planning a career; and What Should They Do? (problem solving), which was constructed to measure one's effectiveness in dealing with problems arising in the course of career development (Crites, 1973c).

Each of the subtests of the Competence Test section consists of 20 five-choice multiple-choice items. A sixth-grade level of reading was generally achieved for the subtests (Crites, 1973c).

Reliability of the Competence Test. Only internal consistency reliability data for the Competence Test was found. Kuder-Richardson Formula 20 coefficients for ninth-graders in the standardization sample were: Self-appraisal, .78; Occupational Information, .85; Goal Selection, .89; Planning, .88; and Problem Solving, .73 (Crites, 1973a).

Validity of the Competence Test. Because of its relative newness, few validity studies for the Competence Test of the CMI have been concluded. However, several arguments and studies presented by Crites (1973a) suggest that the Competence Test has validity. First, that the selection and development of the items for the subtests were conceived in careful accordance with the content of Crites' model for career maturity; and second, that the original content used in writing the final items was derived from the verbal behavior typical of those for whom the test was intended are two arguments Crites used to support validity of the Competence Test. Furthermore, by choosing only items that were strictly increasing functions of grade level, Crites lent to

the validity of the instrument as a measure of a developmental construct. Finally, Crites used the argument that construct validity for the Competence Test was suggested by the fact that the intercorrelations of the subscales of the test were approximately the same as the intercorrelations hypothesized in the career maturity model.

Treatment

The ten-day career education unit involved three major components. One component was self-awareness, which included interpretation of the Rating of Perceived Ability, AEI, GIS, and DAT. Another component of the unit was a filmstrip-cassette workbook activity called Discovery, A Career Education Program which involved a study of the relationship of personality traits to work, a study of work characteristics, a study of reasons why people work, a study of goals in relation to careers, and a brief exposure to occupations representing each of the United States Office of Education's career clusters (Freeman and Lidz, 1973a). The remaining component of the treatment unit was acquaintance with and use of occupational information sources available to the students. A detailed breakdown of the activities involved in the career unit is presented in Appendix C.

Procedure

Designation as Treatment or Control

Administratively it was necessary to give the career education unit to existing English classes within the school. By designating half of the English classes as experimental and half as control, an

even distribution of subjects into experimental and control conditions was achieved, with 170 control and 170 treatment subjects.

Several considerations were taken in designating English classes as treatment or control. First, within the school there were several types of English available to the students--Reading English available for students with diagnosed reading problems, Regular English designed for those who indicate they likely will not attend college, College Preparatory English designed for those who desire extra preparation for college-level English composition, and Honors English for those students who desire an enriched and accelerated program. In order to control the effect of type of English on CMI scores, care was taken to evenly distribute the classes of each type into experimental and control conditions.

Another consideration in designating English classes to treatment and control conditions was the teacher. Although the experimenter was directly responsible for conducting all treatment sessions, the English teacher was present to assist with roll-taking, organization of materials, etc. Therefore, each teacher involved in the study had classes under both treatment and control conditions to reduce the effect of teacher on the results.

A final consideration in assigning existing classes to treatment or control conditions was the experimenter's desire to conduct all treatment groups within the same ten-day time period. In order to accomplish this, six treatment groups were formed to coincide with the six daily class periods. Each of these treatment groups consisted of either an intact regular, an intact college-preparatory or an intact honors class. Reading English students were randomly divided into

treatment or control conditions, and those designated as treatment subjects were combined with the intact treatment classes during the same class period to form the final six groups.

Data Collection

Rating of Perceived Ability, AEI and GIS scores were obtained, respectively, at approximately one-month intervals prior to the career education unit. All testing was conducted via existing ninth-grade social studies classes, and every score was independently checked for accuracy.

Following administration of the career education unit to those classes designated as treatment, the CMI was administered to all subjects via six groups composed of period-wise combinations of ninth-grade social studies classes. CMI testing was thereby completed in three one-hour sessions for each subject on three consecutive days, all CMI testing being completed in the same three-day block. Criterion testing was conducted one week after all treatment subjects had participated in the career education unit. During the one-week interval between treatment and criterion testing, all subjects were on a spring vacation.

Statistical Analysis

Conversion of Data to Rank Order

Scores on the Rating of Perceived Ability were obtained in rank order form. Conversion of AEI and GIS scores to rank order was accomplished by ranking the percentiles associated with the raw scores for the appropriate sex. Ranks associated with sex-based norms were used

because differences in scores due to sex are statistically significant for both the AEI (Ewens, 1956a) and the GIS (Kuder, 1971).

Computation of Degree of Congruence

For each congruence type, the degree of congruence for each subject was the Spearman rank order correlation coefficient between the rank-ordered profiles related to that type.

Computation of Correlation Between

Spearman Rho's and CMI Scores

The Pearson product-moment correlation coefficient was computed between the degree of congruence for each congruence type and the CMI subscale scores. Significance tests were reported for all coefficients and were derived from the use of Student's *t* with *N*-2 degrees of freedom for the quantity

$$r \left[\frac{N - 2}{1 - r^2} \right]^{1/2}$$

A one-tailed test with the .05 level of significance as the criterion was used.

Regression Analysis*

Step 1. A multiple regression equation of the form:

$$\text{CMI}' = a + b_1 \text{GA} + b_2 \text{GR} + b_3 \text{AR} + b_4 \text{TMT} + b_5 \text{GA} \times \text{TMT} + b_6 \text{GR} \times \text{TMT} + b_7 \text{AR} \times \text{TMT}$$

*Completed independently for each CMI subscale.

was computed. Using the method of dummy coding presented by Kerlinger and Pedhauzer (1973), values of $TMI = 1$ for experimental subjects and $TMI = 0$ for control subjects were assigned; and the interaction terms $GA \times TMI$, $GR \times TMI$, and $AR \times TMI$ were formed by multiplying the TMI value for each subject by the subject's appropriate rho value.

Step 2. From the regression equation obtained in Step 1 a new set of predictors was determined as follows: if the partial regression coefficient for GA, GR, and/or AR was nonsignificant, that rho, along with any corresponding interaction of which it was a part (if nonsignificant), was omitted from further analysis. The significant rho's, their interactions, and TMI (whether or not significant in Step 1) were used as predictors in a second regression equation. This step was included to accommodate the possibility that the portion of variance in CMI scores associated with the dropped variables might align with the remaining nonsignificant variables, increasing their contribution to total variance in CMI scores to significant levels.

Step 3. From the resulting equation in Step 2, those variables which contributed to variance in CMI scores (.05 level of significance) were identified. These variables were then used as predictors in another regression equation. This procedure was continued until only variables which were significant at the .05 level remained in the equation. From the final regression equation the effect of the career education unit was examined after other variables were controlled statistically (if significant at the .05 level) or removed from the study (if not significant at the .05 level).

Step 4. The final regression equation's associated R^2 was tested for significance at the .05 level using the F ratio

$$F = \frac{R^2/k}{(1-R^2)/(n-k-1)}$$

where k is the number of independent variables in the equation.

CHAPTER IV

RESULTS

Overview of Chapter

The relationship of one's abilities to one's interests and exposure to a career education unit were the main effect variables involved in the hypotheses of this study. For each of the six CMI scales, this chapter presents the findings related to the hypotheses presented in Chapter I following application of the statistical procedures outlined in Chapter III. Several findings which are not a direct part of the hypotheses of this study, but which are of interest, are presented in Appendix E. Included there are a complete correlation matrix and a table of means and standard deviations for all main effect variables, sex, DAT scores, and CMI scores.

First, correlations between the CMI subscale of concern and the degree of congruence for the three congruence types GA, GR, and AR are presented and examined along with the squares of these correlations. Second, the final regression equation obtained from the procedure discussed in Chapter III will be inspected. The steps involved in removal of nonsignificant variables for each CMI are delineated in Appendix A.

With regard to the final regression equation derived, a summary multiple regression analysis table is presented. The multiple

correlation coefficient for the final regression equation is contained in this summary table. After the significance level of the multiple correlation coefficient is examined, the final regression equation for each CMI scale is presented graphically.

Following the presentation of the results for each CMI scale as discussed above, tables summarizing the results across all CMI scales are offered. These summary tables should provide a convenient reference point for the discussion found in Chapter V.

Analysis of Data

Attitude Scale

Table I presents the results for the hypotheses related to Pearson product-moment correlations between Attitude Scale scores and the degrees of congruence for the three congruence types GA, GR, and AR (See Chapter I, page 7 for definitions).

TABLE I
CORRELATION COEFFICIENTS BETWEEN ATTITUDE SCALE
SCORES AND DEGREE OF CONGRUENCE

Congruence Type	GA	GR	AR
r	.073	.254	.146
Significance Level*	.090	.001	.003
r ²	.005	.065	.021

*One-tailed test of significance

From Table I the conclusion is that two of the three rho's, GR and AR, are correlated positively with Attitude Scale scores with a .05 level of significance as the criterion. Although both of these correlations have a high level of significance, the correlations themselves are not large. In terms of portion of total variance in Attitude Scale scores accounted for, the squares of the correlation coefficients shown in Table I suggest that the degree of congruence between inventoried interests and self-ratings of ability (GR) accounts for approximately seven per cent of the variance in Attitude Scale scores, and the degree of congruence between manifest interests and self-ratings of ability (AR) accounts for approximately two per cent of the variance in Attitude Scale scores.

Concerning the multiple regression analysis of Attitude Scale scores on GA, GR, AR, GAxTMT, GRxTMT, ARxTMT, and TMT, the following regression equation was derived (Appendix A, Figure 13):

$$Y' = 4.15GR + 2.18 TMT + 31.38$$

In accordance with the regression guidelines and significance levels set forth in Chapter III, this equation represents the most appropriate method of prediction of Attitude Scale scores using a subset of the independent variables. The unstandardized partial regression coefficients indicate that if GR were held constant, exposure to the treatment would be associated with an increase of 2.18 units on the Attitude Scale. Likewise, if TMT were controlled statistically, a change of one unit in the GR rho would affect Attitude Scale scores by 4.15 units. Since the range of GR is only from -1 to 1, it might be more illustrative to suggest that a change of one-tenth unit in

GR rho would affect a .415 unit change in Attitude Scale scores.

From the regression summary presented in Table II, the multiple correlation coefficient for the final regression equation is .327 ($.99 F_{2,200} = 4.71$, obtained $F = 20.21$). This value, significant at the .01 level, represents the strength of the relationship between Attitude Scale scores and GR and TMT considered simultaneously. The square of the multiple correlation coefficient, .107, suggests that approximately 11 per cent of the total variance in Attitude Scale scores is explained by the combined linear influence of GR and TMT.

TABLE II
SUMMARY TABLE FOR THE REGRESSION OF ATTITUDE
SCALE SCORES ON GR AND TMT

Variable	Multiple R	R ²	R ² Change
GR	.254*	.064	.064
TMT	.327*	.107	.043

*Significant at .01 level

In order to help clarify the results of the multiple regression analysis, the results are presented graphically in Figure 6. The algebraic derivation of the equations graphed is also included in the figure.

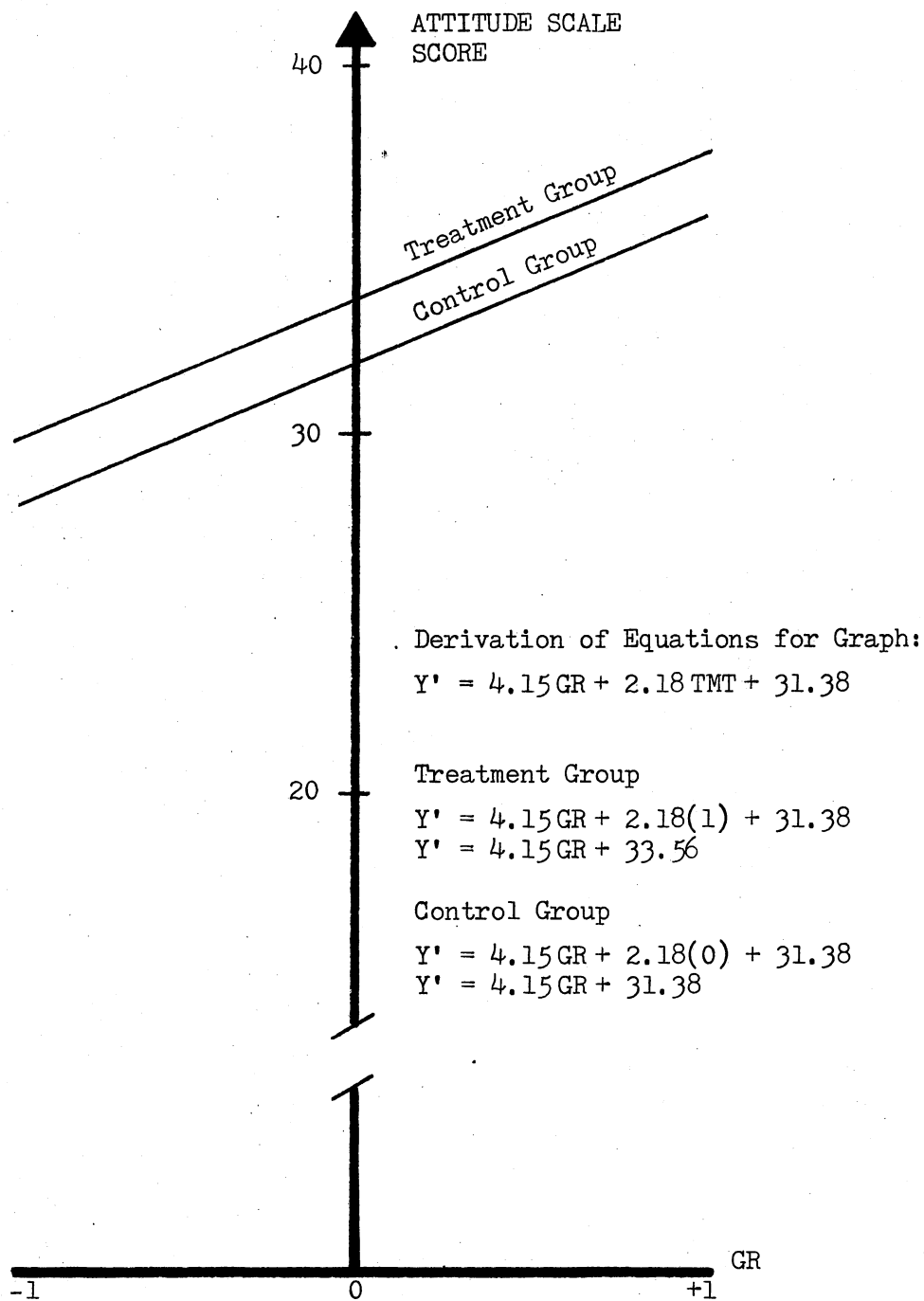


Figure 6. Graph of Multiple Regression Analysis for Attitude Scale

Knowing Yourself (Self-Appraisal)

Results for the hypotheses related to Pearson product-moment correlations between Knowing Yourself scores and the degrees of congruence for the three congruence types GA, GR, and AR are presented in Table III.

TABLE III
CORRELATION COEFFICIENTS BETWEEN KNOWING YOURSELF
SCORES AND DEGREE OF CONGRUENCE

Congruence Type	GA	GR	AR
r	.148	.288	.143
Significance Level*	.003	.001	.004
r ²	.023	.083	.020

*One-tailed test of significance

Examination of Table III indicates that the degree of congruence for all three congruence types is positively correlated with Knowing Yourself scores with a .05 level of significance as the criterion. Although the significance levels for all three coefficients are high, the relatively small size of the coefficients is reflected in the fact that the variances in GA, GR, and AR account for only two per cent, eight per cent, and two per cent, respectively, of the total variance in Knowing Yourself scores as indicated by the squares of the

coefficients.

The final multiple regression equation

$$Y' = 4.90GR - 2.68GR \times TMT + 1.23TMT + 9.62$$

was derived (Appendix A, Figure 14) for Knowing Yourself scores using the independent variables of the study as the universe set. According to the guidelines given in Chapter III, this represents the most appropriate prediction equation.

The multiple correlation coefficient for the final regression equation, .310, is found in Table IV ($F_{.99, 3, 200} = 3.88$, obtained $F = 11.93$). This value, significant at the .01 level, represents the strength of the relationship between Knowing Yourself scores and GR, TMT, and the GRxTMT interaction considered simultaneously.

The square of the multiple correlation coefficient, .096, suggests that approximately 10 per cent of the total variance in Knowing Yourself scores is explained by the variance in TMT, GR, and GRxTMT.

TABLE IV

SUMMARY TABLE FOR THE REGRESSION OF KNOWING YOURSELF
SCORES ON GR, GRxTMT, AND TMT

Variable	Multiple R	R ²	R ² Change
GR	.288*	.083	.083
GRxTMT	.293*	.086	.003
TMT	.310*	.096	.011

*Significant at .01 level

The graphical representation of the regression analysis, along with derivations of the graphed equations, is presented in Figure 7.

Knowing About Jobs (Occupational Information)

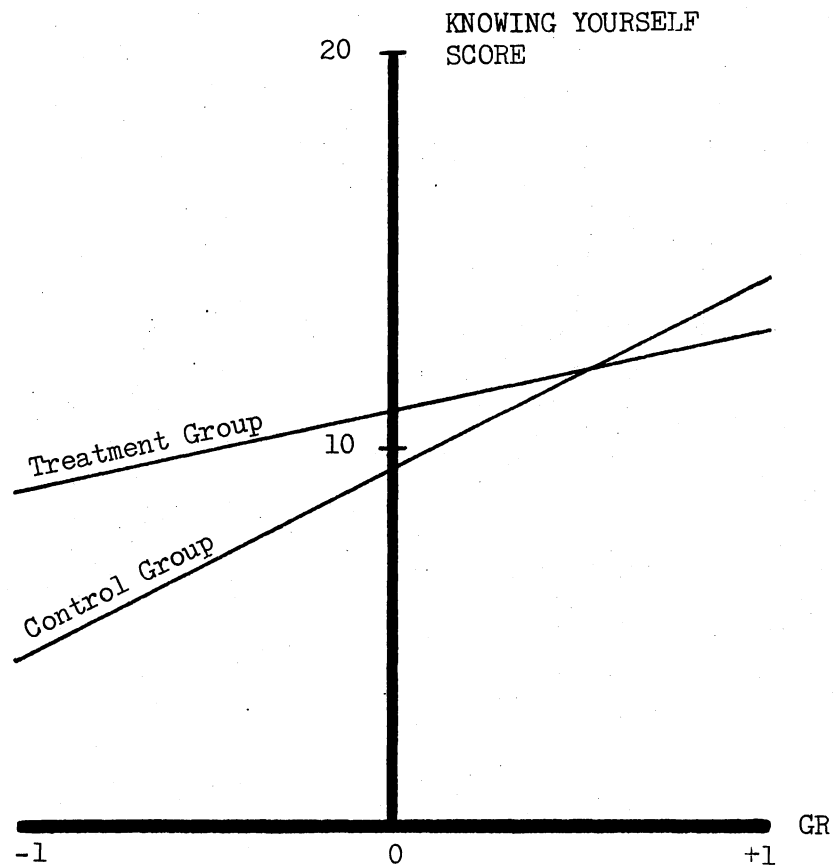
Table V presents Pearson product-moment correlations, the squares of these correlations, and their respective significance levels (one-tailed test) between Knowing About Job scores and GA, GR, and AR.

TABLE V
CORRELATION COEFFICIENTS BETWEEN KNOWING ABOUT JOBS
SCORES AND DEGREE OF CONGRUENCE

Congruence Type	GA	GR	AR
r	.151	.249	.241
Significance Level*	.003	.001	.001
r ²	.023	.062	.058

*One-tailed test of significance

Positive correlations between Knowing About Jobs scores and GA, between Knowing About Jobs scores and GR, and between Knowing About Jobs scores and AR are all significant at the .05 level. Although highly significant, as shown in Table V, the relatively small correlation coefficients' squares indicate that variance in GA, GR, and AR account for only two per cent, six per cent, and six per cent, respectively, of the total variance in Knowing About Jobs scores.



Derivation of Equations for Graph:

$$Y' = 4.90 GR + 1.23 TMT - 2.68 GR \times TMT + 9.62$$

Treatment Group:

$$Y' = 4.90 GR + 1.23(1) - 2.68 GR (1) + 9.62$$

$$Y' = 2.22 GR + 10.85$$

Control Group:

$$Y' = 4.90 GR + 1.23(0) - 2.68 GR (0) + 9.62$$

$$Y' = 4.90 GR + 9.62$$

Figure 7. Graph of Multiple Regression Analysis for Knowing Yourself

According to the statistical tests delineated in Appendix A (Figure 15), the final regression equation

$$Y' = 3.53GR - 1.73GR \times TMT + 13.96$$

was derived. Examination of the unstandardized regression coefficients reveals that for the control group (TMT = 0) a change of one unit in GR is associated with a 3.53 unit change in Knowing About Jobs scores. For the group exposed to the career education unit (TMT = 1) a change of one unit in GR is associated with a 3.53 - 1.73, or 2.80, units change in Knowing About Jobs scores. The final regression equation does not include TMT main effect as a predictor, a result different from the findings for the first two CMI scales.

A summary of the regression of Knowing About Jobs scores on GR and GRxTMT is given in Table VI.

TABLE VI
SUMMARY TABLE FOR THE REGRESSION OF KNOWING ABOUT JOBS
SCORES ON GR AND GRxTMT

Variable	Multiple R	R ²	R ² Change
GR	.249*	.062	.062
GRxTMT	.275*	.076	.014

*Significant at .01 level

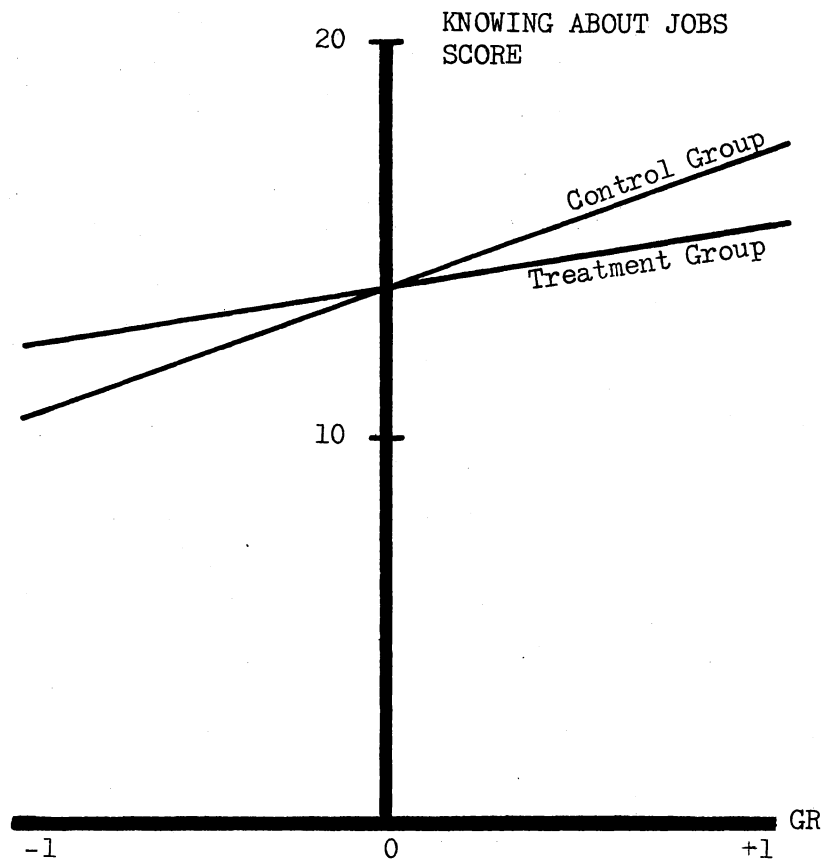
The multiple correlation coefficient .275 from Table VI is significant at the .01 level ($.99^2 F_{2,200} = 4.71$, obtained $F = 13.83$). This value represents the strength of the relationship between Knowing About Jobs scores and GR and GRxTMT considered simultaneously. Squaring the multiple correlation coefficient, one finds approximately eight per cent of the total variance in Knowing About Jobs scores associated with variance in GR and GRxTMT.

The graph shown in Figure 8 should help clarify the GR and GRxTMT effects with respect to Knowing About Jobs scores. Notice that the general direction of both lines is upward right. This reflects the result that an increase in GR is associated with an increase in Knowing About Jobs scores. However, the lines intersect on the ordinate axis, which reflects the lack of the TMT main effect in the analysis.

Choosing a Job (Goal Selection)

Table VII presents Pearson product-moment correlations, the squares of these correlations, and their respective significance levels (one-tailed test) between Choosing a Job scores and GA, GR, and AR.

Using the .05 significance level as the criterion, all correlation coefficients presented in Table VII are significant. Variances in GA and AR each account for approximately three per cent of the variance in Choosing a Job scores. Variance in GR accounts for nearly six per cent of the variance in Choosing a Job scores. These small contributions to total variance are due to the small, though highly significant, correlation coefficients.



Derivation of Equations for Graph:

$$Y' = 3.53 GR - 1.73 GR \times TMT + 13.96$$

Treatment Group:

$$Y' = 3.53 GR - 1.73 GR (1) + 13.96$$

$$Y' = 1.80 GR + 13.96$$

Control Group:

$$Y' = 3.53 GR - 1.73 GR (0) + 13.96$$

$$Y' = 3.53 + 13.96$$

Figure 8. Graph of Multiple Regression Analysis for Knowing About Jobs

TABLE VII
CORRELATION COEFFICIENTS BETWEEN CHOOSING A JOB
SCORES AND DEGREE OF CONGRUENCE

Congruence Type	GA	GR	AR
r	.176	.236	.174
Significance Level*	.001	.001	.001
r ²	.031	.056	.030

*One-tailed test of significance

Following the multiple regression procedures given in Appendix A (Figure 16) all but one variable, GR, was eliminated from the final regression equation:

$$Y' = 2.47GR + 11.61$$

One independent variable remaining in the final regression equation obviates a multiple regression discussion. From the simple regression equation, the regression coefficient 2.47 indicates that a unit change in GR is associated with a change of 2.47 units in Choosing a Job scores. The final equation suggests that exposure to the career education unit was not associated with changes in Choosing a Job scores.

The graph of the regression of Choosing a Job on GR is presented in Figure 9. The absence of an interaction effect and/or a treatment effect simplifies the graphic interpretation.

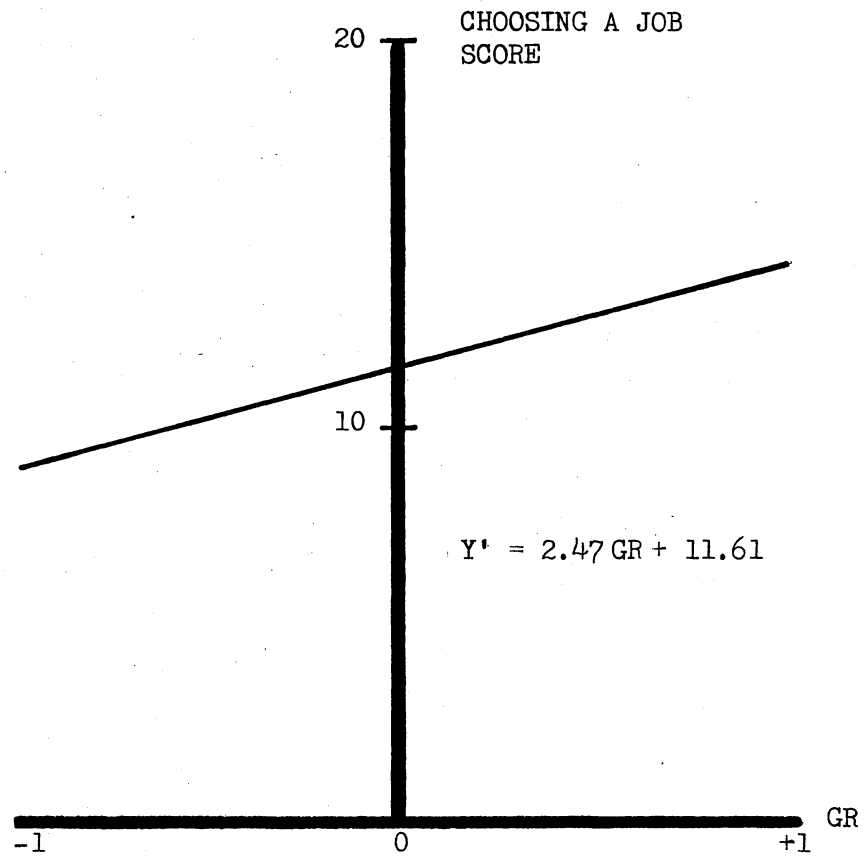


Figure 9. Graph of Multiple Regression Analysis
for Choosing a Job

Looking Ahead (Planning)

The Pearson product-moment correlations between the Looking Ahead scores and GA, GR, and AR, along with corresponding significance levels and squared correlation coefficients are presented in Table VIII.

TABLE VIII
CORRELATION COEFFICIENTS BETWEEN LOOKING AHEAD
SCORES AND DEGREE OF CONGRUENCE

Congruence Type	GA	GR	AR
r	.109	.185	.130
Significance Level*	.022	.001	.008
r ²	.012	.034	.017

*One-tailed test of significance

All correlations in Table VIII are significant at the .05 level. Examination of the r²'s shows that GA, GR, and AR account for approximately one per cent, three per cent, and two per cent of the total variances in Looking Ahead scores, respectively. Again, these small percentages are due to small but significant correlation coefficients.

GR was the only variable remaining in the regression analysis after the tests outlined in Appendix A (Figure 17) were performed.

The analysis resulted in the equation:

$$Y' = 2.35GR + 11.45$$

From this simple regression equation, the regression coefficient suggests that a change of 2.35 units on the Looking Ahead subscale is determined by a unit change in GR. The absence of TMT in the equation leads to the conclusion that, for the Looking Ahead subscale of the CMI, the career education unit made no difference.

Figure 10 presents the regression results graphically.

What Should They Do? (Problem Solving)

Table IX presents Pearson product-moment correlations, the squares of these correlations, and their respective significance levels (one-tailed test) between Choosing a Job scores and GA, GR, and AR.

TABLE IX
CORRELATION COEFFICIENTS BETWEEN WHAT SHOULD THEY DO?
SCORES AND DEGREE OF CONGRUENCE

Congruence Type	GA	GR	AR
r	.061	.215	.131
Significance Level*	.125	.001	.008
r ²	.004	.046	.017

*One-tailed significance test

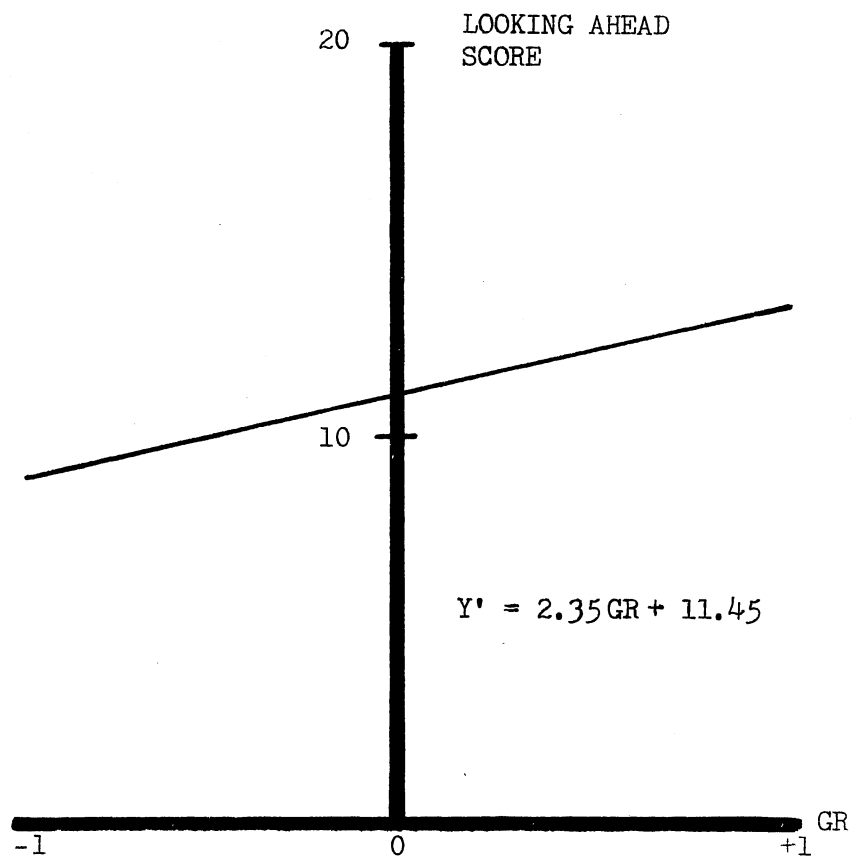


Figure 10. Graph of Multiple Regression Analysis for Looking Ahead

From Table IX, correlations between What Should They Do? scores and GR and AR are significant at the .05 level. Concerning total variance in What Should They Do? scores, GR and AR account for approximately five per cent and two per cent, respectively.

All independent variables except GR were removed during the regression analysis for What Should They Do? resulting in the simple equation (Appendix A, Figure 18):

$$Y' = 2.18GR + 8.48$$

The regression coefficient can be interpreted in the same fashion as for the two preceding CMI subscales. That is, a unit change in GR is associated with a 2.18 units change in What Should They Do? scores. From the regression equation, one's attention is again drawn to the conclusion that the career education unit had no effect on the CMI scores.

Graphically, the multiple regression analysis result for What Should They Do? appears in Figure 11.

Summary

In this section several tables will be presented which summarize the results obtained across all CMI scales. The tables will be followed by a brief discussion of several noticeable trends.

A survey of the summary tables in this section reveals several trends. First, the importance of GR in comparison with GA and AR stands out. From Table X, in all cases the correlation between GR and CMI scales is higher than the corresponding correlations for either GA or AR.

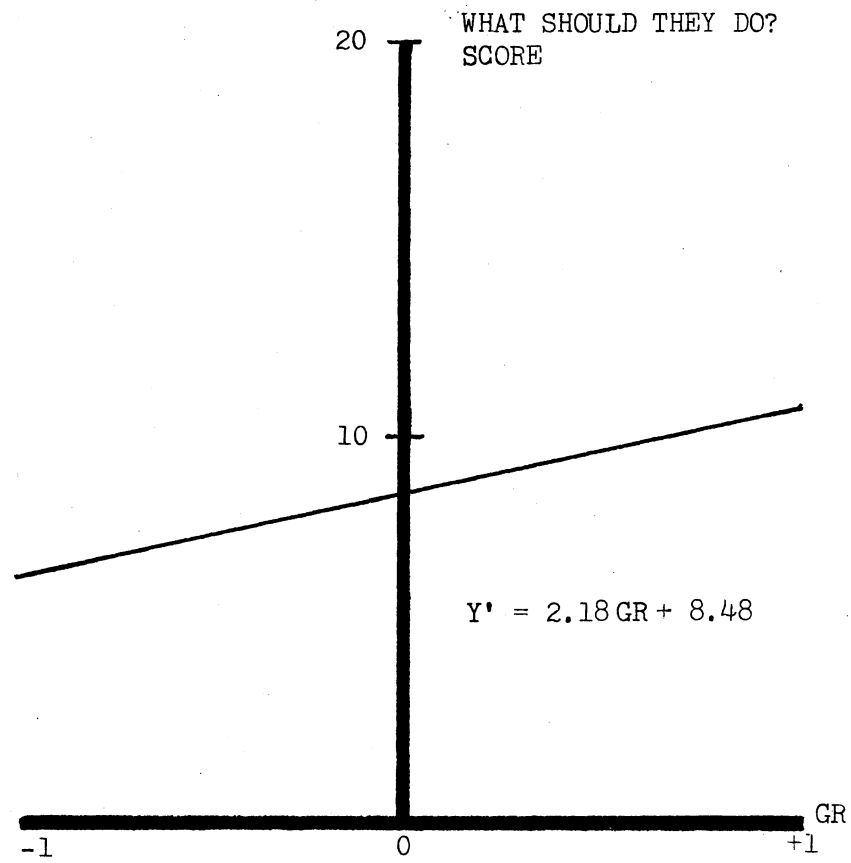


Figure 11. Graph of Multiple Regression Analysis for What Should They Do?

TABLE X
CORRELATIONS BETWEEN ALL CMI SUBSCALES AND RHO'S*

<u>CMI</u> Subscales	GA	GR	AR
Attitude Scale	NS	.254	.146
Knowing Yourself	.148	.288	.143
Knowing About Jobs	.151	.249	.241
Choosing a Job	.176	.236	.174
Looking Ahead	.109	.185	.130
What Should They Do?	NS	.215	.131

* $\alpha < .05$

Table XI brings the relative influence of GR even more to one's attention, for GR is the only congruence type appearing in the final regression equation for any CMI scale--and it appears in all of these. Also, the only interaction terms remaining in final regression equations were those with GR components.

Another trend is that generally correlation coefficients were low--both simple correlations between rho's and CMI scores (Table XI) and multiple correlation coefficients (Table XII), which can be interpreted as Pearson product-moment correlations between obtained CMI scores and CMI scores predicted from the multiple regression equations.

Finally, one notices in Table XI a lack of treatment effect for four of the six CMI scales.

TABLE XI
VARIABLES IN FINAL REGRESSION EQUATIONS

<u>CMI</u> Subscales	GA	GR	AR	GAxTMT	GRxTMT	ARxTMT	TMT
Attitude Scale		**					**
Knowing Yourself		**			*		**
Knowing About Jobs		**			*		
Choosing a Job		**					
Looking Ahead		**					
What Should They Do?		**					

*Significant at .05 level

**Significant at .01 level

TABLE XII
MULTIPLE CORRELATION COEFFICIENTS*

	Attitude Scale	Knowing Yourself	Knowing About Jobs	Choosing a Job	Looking Ahead	What Should They Do?
R	.327	.310	.275	.236	.185	.215
R ²	.107	.096	.076	.056	.034	.046

*Coefficients for the last three CMI scales represent simple correlations

The results of this study as presented in this Chapter will be discussed, along with their limitations and implications, in Chapter V.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

Review of the Study

The purpose of this study was to generate information related to the Career Maturity Inventory, CMI. Three organismic variables: the congruence of one's inventoried interest pattern with one's activity experience pattern (GA), the congruence of one's inventoried interest pattern with one's self-rated ability pattern (GR), and the congruence of one's activity experience pattern with one's self-rated ability pattern (AR) were considered along with one stimulus variable--a career education unit (TMT). Specifically, the core of this study was an examination of the relationships that these variables and that the congruence x treatment interactions had with CMI scores.

The Pearson product-moment correlations between each organismic variable and each subscale of the CMI were obtained. Also, a multiple regression analysis using the three organismic variables, the treatment, and the three organismic variable x treatment interactions as predictors was conducted for each CMI subscale.

Summary of Findings

One of the organismic variables, GR, became prominent in the study by having the highest correlations with all CMI subscales and by

remaining in the final regression equation for all CMI subscales.

From the multiple regression analysis, the career education unit was associated with increases in CMI scores for only two of the CMI subscales--the Attitude Scale and Knowing Yourself (Self-Appraisal). Also, the interaction of the treatment and GR was significant for two CMI subscales--Knowing Yourself and Knowing About Jobs (Occupational Information).

Limitations

Before presenting conclusions and further discussion, several issues need to be acknowledged. First, the subjects in this study were all ninth-graders in one school. This naturally limits the generalizations which can be made concerning other populations. Also, because of administrative necessity, students were not randomly assigned to treatment and control conditions. Rather, existing classes (albeit balanced as much as possible with respect to level of class) were assigned treatment and control conditions. The use of intact classes with their group idiosyncrasies and differences in size reduced the standardization of the career education unit and its replicability as a treatment variable.

Another limitation is that valuable information was lost from the profiles when the GIS and AEI results were converted to rank order. Finally, although many of the correlations found in this study were significant at high levels of confidence, the magnitude of the coefficients themselves was generally not high.

Conclusions

One major conclusion is that GR is an important variable in the study of the CMI. Several explanations may be offered as to the importance of the association between GR and CMI subscales. First, of the three congruence types in this study, GR was the most highly correlated with a measure of general scholastic aptitude, the DAT Verbal Reasoning + Numerical Ability score. DAT Verbal Reasoning + Numerical Ability, in turn, is correlated positively with all subscales of the CMI. Also, subjects during the study voiced more complaints about taking the Activity Experience Inventory, AEI, than about either the Kuder GIS or the Rating of Perceived Ability, particularly about its length and small print. Perhaps a degree of tedium associated with taking the AEI reduced its accuracy, which in turn would affect the validity of both congruence types containing the AEI, GA and AR, as measures of congruence for the subjects.

Another conclusion is that generally the ten-day career education unit was not an effective change agent for CMI scores. With respect to the two CMI subscales which did reflect a treatment effect, an examination of the content of the unit is explanatory. For the Attitude Scale, throughout the unit emphasis was placed on a positive attitude toward work. Reasons (besides money) that people work were discussed, and the importance of becoming personally involved in decision making in accordance with one's interests, personality characteristics, abilities, and goals was stressed. Students were also encouraged to actively seek information and assistance with regard to career decisions.

The Knowing Yourself (Self Awareness) subscale was the other CMI subscale associated positively with the career education unit. This result again is reflected by examination of several major emphasis areas in the unit. For example, subjects were encouraged to list and discuss their own personality traits and goals. Also, interests and abilities were examined via discussion and interpretation of standardized tests.

For the remaining CMI subscales, improvements in the CMI score generally did not follow exposure to the career education unit. With respect to the Knowing About Jobs (Occupational Information) subscale, although time was spent in occupational research, there was not time enough for adequate study of a broad variety of occupations. Some students expressed boredom specifically with the films in the unit related to occupational information. Many of these students were anxious to find out about a few occupations of interest to them. Another way of expressing this is that learning about a variety of occupations needs to begin at an earlier age to be extensive--ninth-graders (whether treatment or control) are often unfortunately too established in their ways to be willing to do widespread occupational information searches.

The Choosing a Job (Goal Selection) subscale, although designed to measure something other than occupational information, is likely to not have been associated with the career education unit for reasons similar to those given for the previous scale. Consider the following items from the CMI:

"Knowing About Jobs" item--after describing Patty's job characteristics, the question "What is her occupation?" is asked. The choices are:

- F instrument assembler
- G keypunch operator
- H machinist
- J optician
- K don't know

"Choosing a Job" item--after describing Debbie's interests and abilities and the job characteristics of her part-time work, the following question is asked, "Which of the following occupations would be best for her?" The choices are:

- F dental hygienist
- G instrument assembler
- H machinist
- J telephone operator
- K don't know

One notices that for both the Knowing About Jobs and Choosing a Job subscales, the answer choices are in the form of occupations. Many of the occupations on the two scales involved, as exemplified by the sample items above, are similar or identical. Therefore, it seems likely that a lack of information about occupations would have a negative effect on both scales. Perhaps it is no coincidence that the correlation between Knowing About Jobs and Choosing a Job is .66, while the next highest correlation between subscales is .59 for the data in this study (Appendix E, Table XIV).

The remaining two scales, Looking Ahead (Planning) and What Should They Do? (Problem Solving), were also likely not affected by the career education unit due to a lack of emphasis toward the specific types of items on these scales during the treatment.

A final comment in the area of lack of treatment effect--it is quite possible that the bombardment of information and ideas during the ten-day unit was too much for some students to assimilate before the criterion test was given. Both initial confusion and the tight schedule of the compacted unit could have reduced the effectiveness of the treatment.

Another conclusion, at least for some types of students on two of the CMI subscales, is that the treatment had an adverse effect on CMI scores. The interaction between GR and treatment for both the Knowing Yourself and Knowing About Jobs subscales are difficult to explain, particularly since the interactions, as shown in Figures 7 and 8, were disordinal. That is, there was a tendency for treatment subjects with high GR levels to score lower than control subjects on these two scales.

For the Knowing Yourself subscale, several explanations for the GR x TMI interaction are plausible. First, people with high GR levels may have felt quite comfortable with their similar interest and ability perceptions before the unit. If, however, the unit exposed these students to new considerations and new interest and ability perceptions, it is possible that confusion about self awareness could result which could lower Knowing Yourself scores. Such students might be those whose high GR levels were based on less than accurate perceptions. This explanation rests on an assumption that a person could have a high but

inaccurate GR if one's self-perceptions are inaccurate. Such subjects could be the "victim" of the treatment, in the sense that their immediate confusion could have lowered their CMI score below that of comparable control subjects. An additional explanation for the GRxTMT interaction will be examined later.

Explanations for the interaction of the treatment with GR, with respect to the Knowing About Jobs subscale, are tenuous at best. How could high GR people, after a week of occupational films and library research, get lower scores on a measure of occupational information than similar students in the control group? Of course, some students might have restricted their range of occupational information searching if their high GR congruence was accompanied by a narrowed interest range. This could account for some of the lower Knowing About Jobs scores for students with high GR levels, but it does not accommodate the result that the control high GR subjects tended to outscore the treatment high GR subjects. Perhaps boredom for the high GR subjects could have contributed to the interaction. If high GR is associated with narrowed ranges of occupational preference, then it is possible that many of the complaints of "boring" leveled against the occupational information films were manifestations of subjects' interests in other areas. Such boredom could affect the attitude of subjects to the extent that, if the Knowing About Jobs subscale was perceived as more of the same, a less than full effort on that subtest might be made following a week of occupational information treatment. For the treatment and GR interaction on this scale, the reader is also reminded of the possibility of a type I error.

Before proceeding, another possible source of the interactions found in this study should be considered. This source involves the actual structure of the Competence Test items, which all contain the response "don't know" as the last choice within the multiple-choice format. Is it possible that some students who are knowledgeable and thorough might decide that "don't know" is the most mature response--that, in fact, not enough information is given in the three or four sentences to make the correct choice? Consider the following question from the Knowing Yourself subscale:

Katherine has a telescope in her backyard which is strong enough for her to study the stars and planets. When her father first set it up, she thought of it as a toy, but now she spends more and more time with it. She has studied astronomy at school and thinks she may major in it at college.

What do you think?

- A. She has the makings of an astronomer [spelling used in test booklet]; she should definitely go ahead with her plans.
- B. Before she decides about college, she should ask an astronomer's advice.
- C. Her interest in astronomy is strong enough, and she knows enough about it, to plan further study.
- D. She can't possibly decide if she has either aptitude or interest in astronomy from a backyard telescope.
- E. Don't know

According to the answer key, the mature response is C. Might a career education unit which emphasized the usefulness of talking to people in specific occupations affect a person's answer? Does choice B mean that Katherine should ask an astronomer whether she should go to college, or does it mean that before she decides on a college major in astronomy she should talk to an astronomer? Considering choice C, did Katherine

have a course in astronomy, or did she study it for a week in general science? Does she really "know enough about it"--what were her grades, and how deep was the mathematical portion of her study? Her interest was defined by her looking at planets and stars from her backyard. Should she check with an astronomer to find out how similar that interest is to his actual job characteristics?

Another item example can be given. The item reads:

Nick sometimes feels there's nothing that he's very good at. He has about average grades in school, and he is not an athlete. He has not had the time for many outside activities; he works after school to help support his family. His younger brothers and sisters think he is a great guy, but he wonders what he can do after he finishes high school.

What do you think?

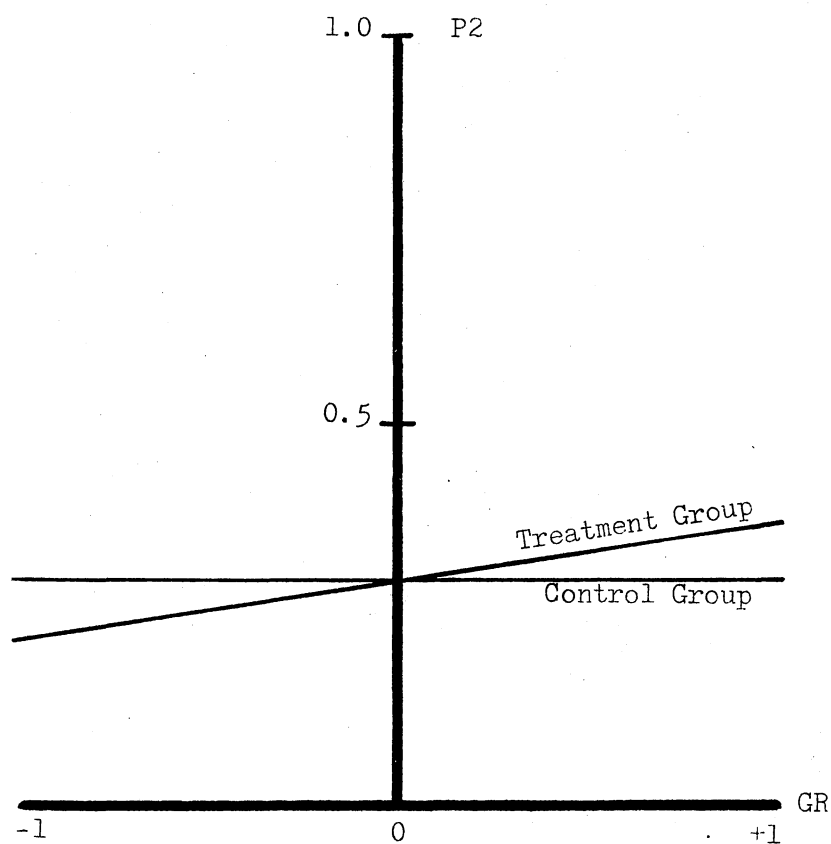
"His willingness to work and his concern for others will help him find and hold any job." is the correct response. Any job?

To avoid preterition of this possible "don't know" explanation for the interactions, the following statistical analysis was conducted.

For each student, the proportion of incorrect responses that were "don't know" was determined. This proportion (labeled P2 for the Knowing Yourself subscale and P3 for the Knowing About Jobs subscale) was entered into a regression analysis as a dependent variable, with GR, GRxTMT, and TMT as predictor variables. One result, that GRxTMT serves as a predictor for P2 (.01 level), is explanatory. The regression equation is

$$P2' = .104GRxTMT + .330$$

which is graphed in Figure 12.



Derivation of Equations for Graph:

$$P2' = .104 GR \times TMT + .330$$

Treatment Group:

$$P2' = .104 GR (1) + .330$$

$$P2' = .104 GR + .330$$

Control Group:

$$P2' = .104 GR (0) + .330$$

$$P2' = .330$$

Figure 12. Graph of GR x TMT With Respect to the Proportion of Incorrect Responses Which Were Marked "Don't Know"

Studying the graph in Figure 12, one finds that for high GR subjects, those in the treatment group tended to use a higher proportion of "don't know" responses than did the control subjects. This may reflect excessive caution among high GR treatment subjects, or it may reflect mature, more thorough thinking (an unfortunate interpretation with respect to validity of the CMI). At the low GR levels, it is possible that the new information gained by the subjects during the treatment increased their confidence or risk-taking behavior beyond that appropriate for their ability level--an example of "a little bit of information doing more harm than good."

For Knowing About Jobs, the regression of P3 on GR, GRxTMT, and/or TMT did not produce significant F-ratios.

Recommendations

Parts of this study need to be revised and/or replicated, and new studies and career education procedures which take into consideration the results of this investigation are appropriate. In view of these suggestions, the following recommendations are made:

1. More research is needed to study the relationships between GR and CMI scores. The possibility that people with low GR degrees have different career education needs than those with high GR degrees exists, and this is accentuated by the disordinal GRxTMT interactions found for two of the CMI scales in this study. In this area, the possibility that high GR subjects have narrowed ranges of occupational preferences should be examined.

2. With respect to the interactions found in this investigation, the fact that many career education programs are continuing at full speed should be considered with caution if it is possible that for some students the programs are in any way adversely affecting career development.
3. If research involving career education is to be most helpful, the actual career education treatment used should be specified as explicitly as possible in order to allow replication and appropriate application of results.
4. If possible, career education should not be compressed into a short treatment period. Longer programs should have more positive and lasting effects on career maturity.
5. Whenever possible, random assignment of subjects to treatment or control conditions should be made in further studies with an experimental career education variable.
6. Any parts of this study which are replicated would be more valuable if a more widespread sample could be drawn.
7. Other variables, such as sex, race, socio-economic status, and aptitude should be incorporated with the results of this study.
8. Longitudinal studies with variables such as GR should be conducted. If GR is associated with career maturity in adolescence, studies relating GR to conditions later in life, such as job satisfaction, might be productive. Also, research concerning efforts to increase the degree and accuracy of GR should be conducted.

9. The effect of career education programs on the number of "don't know" responses on the Competence Test scales should be examined. It is possible that some subjects exposed to career education might, because of their learning, feel that more information is needed to appropriately answer a question. Is a desire for more information always an immature career development response? Yet, the "don't know" option is available for every item within the Competence Test subtests, and its selection is always scored as incorrect.
10. A measure other than the Rating of Perceived Ability, at a higher scale of measurement more in line with that of the GIS and AEI, could be developed. This would prevent the loss of information which occurs when GIS and AEI scores are converted to rank (ordinal) measurement for profile congruence analysis. At interval rather than ordinal levels of measurement, alternate methods of pattern congruence measurement could be made. For example, the profiles could be examined for congruence using a generalized distance formula in a 10-dimensional vector space.
11. The effects of AR should be examined using the new edition of the AEI (Ewens, to be published), and the use of sex-based percentiles on this instrument and the GIS should be compared to the use of total percentiles in defining profile congruence.
12. Research similar to this study should be conducted with other measures of career maturity.

13. Caution should be used with the CMI. There are still many questions to be answered through research about its appropriateness as an evaluative or diagnostic instrument. Faults may not all lie in the career education program being evaluated or the student being diagnosed--the CMI could be inadequate.

Concluding Comment

Hopefully this study has provided some insight into the nature of career maturity as measured by the CMI. At both theoretical and practical levels, perhaps some questions have been raised, and perhaps some strategies have been suggested, which will provide at least a measure of direction in career development theory.

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APPENDIXES

APPENDIX A

DERIVATION OF FINAL REGRESSION EQUATIONS

GA	1.637			
GR	9.263**	7.987**	17.521**	25.626**
AR	5.311*	3.904*	1.354	
GA x TMT	0.811			
GR x TMT	3.312	0.083		
AR x TMT	0.007	2.538		
TMT	7.861**	11.604**	16.608**	16.153**
	STEP 1	STEP 2	STEP 3	STEP 4

$Y' = 4.15 GR + 2.18 TMT + 31.38$

* F-value Significant at .05 Level

** F-value Significant at .01 Level

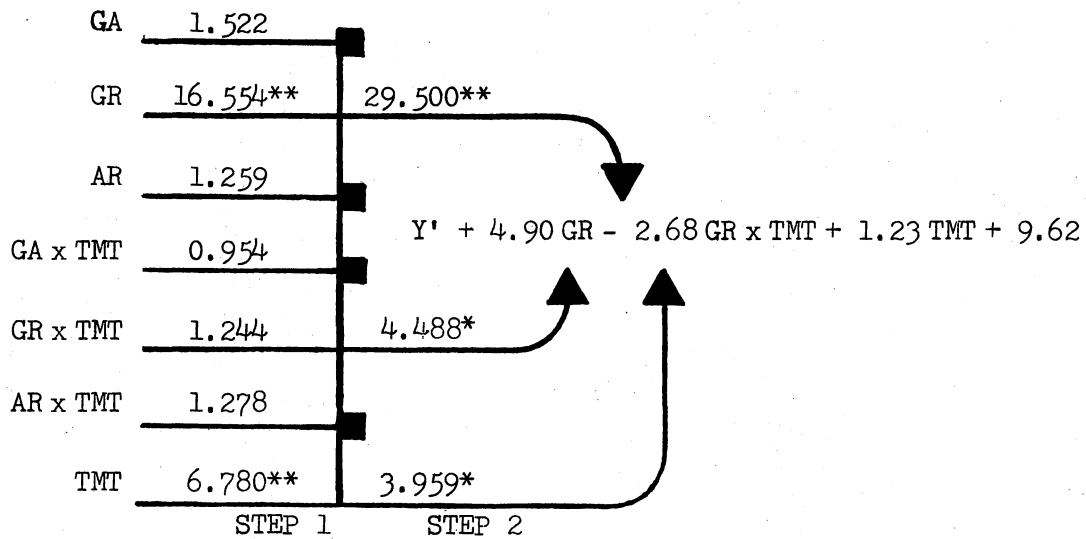
Step 1. All main effect and interaction variables were entered into the analysis. From the multiple regression equation containing all of these terms, the nonsignificant rho, GA, was dropped. Its corresponding interaction term, GA x TMT, was also nonsignificant and therefore dropped.

Step 2. All variables except GA and GA x TMT were entered into a new equation. Even though GR x TMT and AR x TMT were nonsignificant in Step 1, they were entered in Step 2 under the possibility that they would gain significance due to the dropped variables. In the new equation, only GR, AR, and TMT had significant F-values, therefore GR x TMT and AR x TMT were dropped from the next step.

Step 3. With the three variables remaining in Step 2, a new regression equation was generated. At this time, AR's F-value was too small for significance, and AR was therefore dropped.

Step 4. The remaining two variables, GR and TMT, were re-entered into another regression analysis and maintained their significant F-values. The final regression equation was derived from this step.

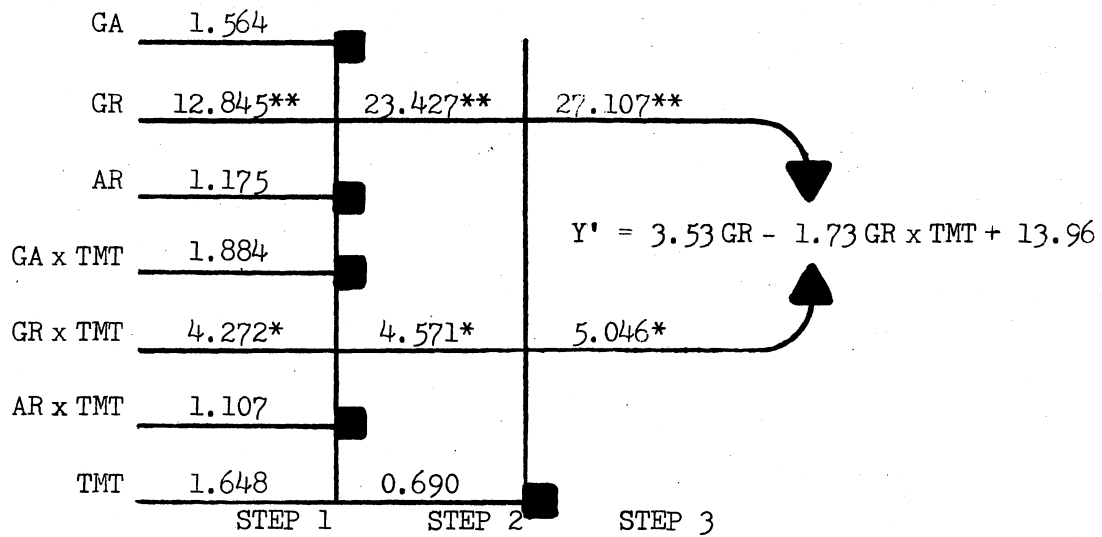
Figure 13. Derivation of Final Regression Equation for Attitude Scale With Stepwise Explanation



*F-value Significant at .05 Level
 **F-value Significant at .01 Level

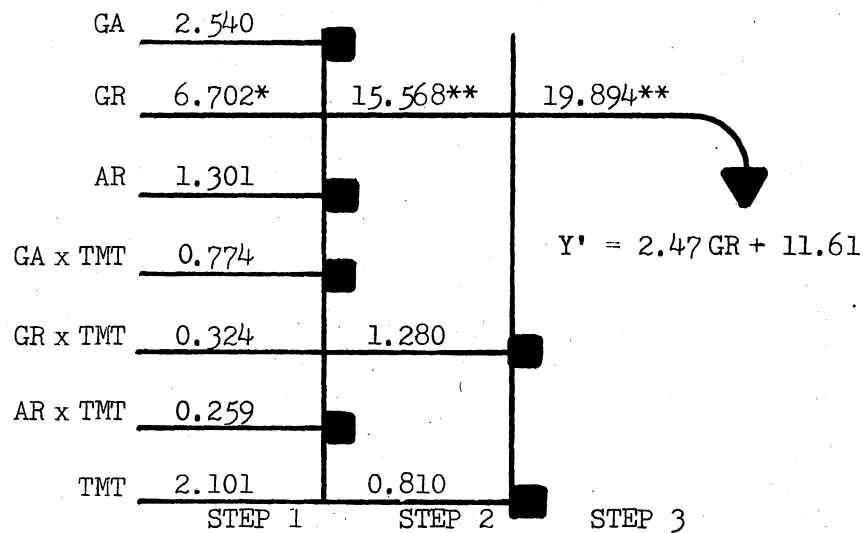
- Step 1. All main effect and interaction variables were entered into the analysis. From the resulting multiple regression equation, GA and AR F's were nonsignificant. Checking the interactions which contained GA and AR components, one finds nonsignificant ratios, and these interactions were therefore dropped along with GA and AR.
- Step 2. The remaining variables were entered into a new analysis, and all had significant F-values. Therefore, the final regression equation was derived from this result.

Figure 14. Derivation of Final Regression Equation for Knowing Yourself Subscale With Stepwise Explanation



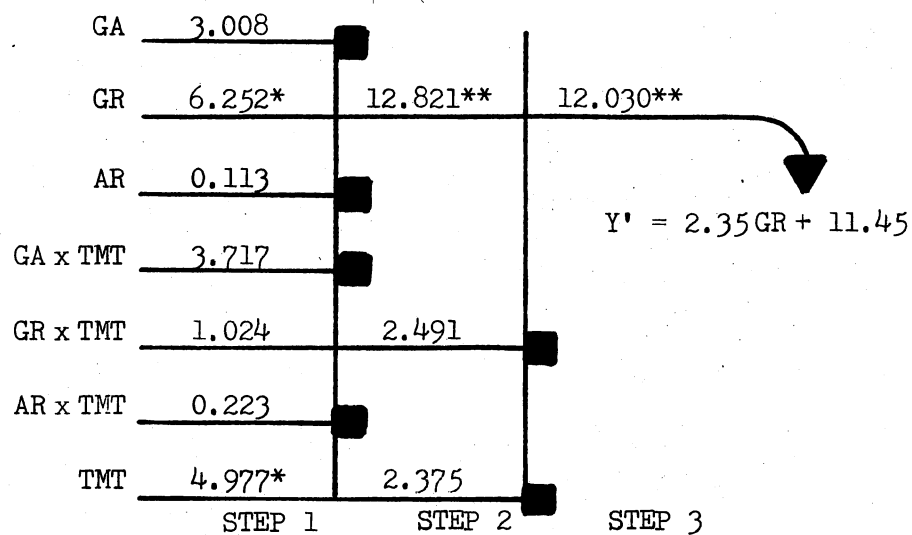
*F-value Significant at .05 Level
 **F-value Significant at .01 Level

Figure 15. Derivation of Final Regression Equation for Knowing About Jobs Subscale



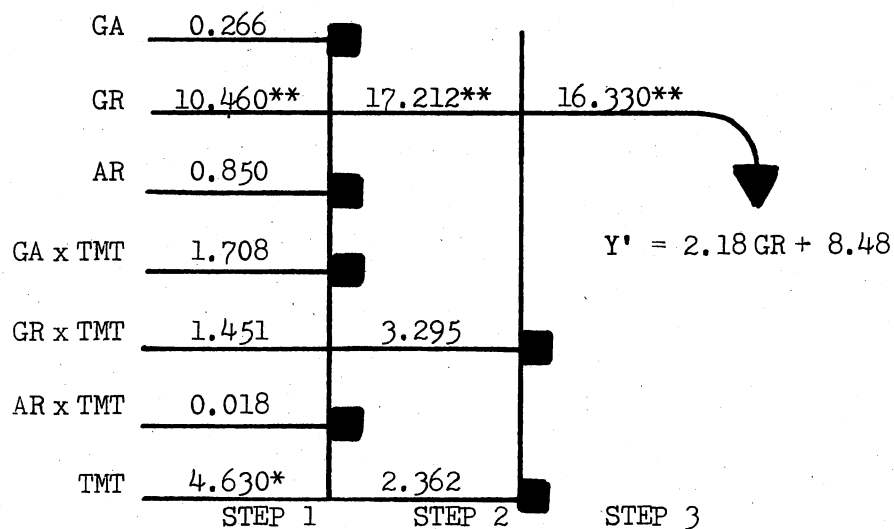
*F-value Significant at .05 Level
 **F-value Significant at .01 Level

Figure 16. Derivation of Final Regression Equation for Choosing a Job Subscale



*F-value Significant at .05 Level
 **F-value Significant at .01 Level

Figure 17. Derivation of Final Regression Equation for Looking Ahead Subscale



*F-value Significant at .05 Level
 **F-value Significant at .01 Level

Figure 18. Derivation of Final Regression Equation for What Should They Do? Subscale

APPENDIX B

RATING OF PERCEIVED ABILITIES

English teacher _____

Period _____ Sex: M F

Type of English _____

Name: _____

In the process of day-to-day living individuals become involved in activities of many types and continually assess their performance in these activities. Through these experiences an individual develops an impression of his/her ability to function well or poorly, or some place between these extremes, in a wide range of activities. For purposes of this task this "impression of ability" will be referred to as "perceived ability." Do not write on the slips of paper.

Each of the ten slips of paper handed to you has a term on it which represents a category of activities (kinds of experience). Please arrange these slips of paper in order of your impression of your ability (perceived ability) with the area of highest ability being considered a rank of one (1) and the lowest ability a rank of ten (10). Write the order of your perceived abilities on the form below.

AREA:

RANKING OF PERCEIVED ABILITY:

Outdoor	_____
Mechanical	_____
Computational	_____
Scientific	_____
Persuasive	_____
Artistic	_____

AREA (Continued)

RANKING OF PERCEIVED ABILITY

Literary

Musical

Social Service

Clerical

OUTDOOR

Farmer, Florist, Tree Surgeon,
Surveyor, Nurseryman, County
Extension Worker, Forrester,
Telephone Lineman, etc.

ARTISTIC

Artist, Sculptor, Dress Designer,
Architect, Hairdresser, Interior
Decorator, Photographer, Window
Display Worker, etc.

MECHANICAL

Electrician, Carpenter, Lens
Grinder, Dressmaker, Upholsterer,
Cleaning and Dying Worker, Auto-
mobile Repairman, Toolmaker, etc.

LITERARY

English Teacher, Poet, Editor,
News Reporter, Librarian, Actor,
etc.

COMPUTATIONAL

Bookkeeper, Accountant, Office
Machine Operator, Bank Teller,
Mathematician, etc.

MUSICAL

Musician, Music Teacher, Music
Critic, Music Store Clerk,
Arranger, Dancer, Disc Jockey, etc.

SCIENTIFIC

Physician, Chemist, Engineer,
Dental Hygienist, Meteorologist,
Pharmacist, Dental Technician,
etc.

SOCIAL SERVICE

Social Worker, Teacher, Nurse,
Personnel Worker, Hospital
Attendant, Scout Leader,
Clergyman, Counselor, etc.

PERSUASIVE

Salesman, Personnel Manager, Buyer,
Collector of Bills and Accounts,
Adjustment Clerk, Lawyer, Radio
Announcer, etc.

CLERICAL

File Clerk, Statistician, Mail
Clerk, Stock Clerk, Telephone
Operator, Secretary, Typist,
Cashier, etc.

APPENDIX C

CAREER EDUCATION UNIT

Day 1

The career education unit was introduced to the students with a discussion of its general purposes of promoting self-awareness, awareness of personality characteristics and their relation to work, awareness of general work characteristics of jobs, awareness of the reasons people work, awareness of the importance of planning for one's goals, awareness of occupational clusters, and use of various sources of occupational information. It was emphasized that the general purpose of the unit was not to have the students decide what they are going to be, but to have them become familiar with many of the things that are important to consider in developing a career choice or in later career changes.

Student responsibilities to the unit were explained as group participation, self-discipline and attentiveness, acceptance of others' rights to express viewpoints, and information seeking. The counselor's responsibilities of facilitating group discussions, serving as a resource person, organizing the unit, and helping the students maintain a constructive level of discipline when necessary were discussed.

A convenient filing system for each student's test results, notes and occupational research data was established by providing each student with a large envelope. The envelope was used to maintain all materials collected by the student during the unit. Although the content of the envelope belonged to the student, each envelope was left with the counselor daily to prevent loss during the unit.

Following the introduction to the unit and an explanation of its mechanics, the results of the Kuder GIS and the AEI were given to the

students and interpreted. To save time during the unit, all test scores which were to be plotted on interpretive leaflets were so plotted by the counselor before the unit began.

Day 2

The Discovery filmstrip "Thinking About Personalities" was given and the Career Log exercises for the Discovery unit (Freeman and Lidz, 1973b) on pages 11-13 were completed. (All exercises used from the Career Log were completed either via group discussion or written on note paper to be filed in the students' envelopes.)

Goals

1. To help students understand that each person is an individual with a unique personality.
2. To introduce students to the concept of personality traits.
3. To enable students to examine their own personalities in work and life situations (Freeman and Lidz, 1973a).

Day 3

The DAT profiles plotted on the interpretative pamphlet Your Aptitudes as Measured by the Differential Aptitude Tests (Psychological Corporation, 1973) and Rating of Perceived Abilities sheets were given to the students and interpreted.

Goals

1. To encourage students to relate abilities to various occupations.
2. To encourage students to compare their perception of their abilities to their obtained DAT scores.
3. To help students understand the importance of both interests and abilities in career decision steps.

Day 4

The Discovery filmstrips "Thinking About Work" and "Why People Work" were shown. For the first filmstrip, the Career Log exercise "Looking at Jobs," pages 26-27, was discussed. Also, students were asked to complete the sentence, "The work characteristics of most interest to me are _____."

Responses to this completion exercise were filed in the student envelopes. For the second filmstrip, the Career Log exercises on pages 40-44 were discussed.

Goals

1. To introduce the student to the concept of work characteristics, the things which make one job different from another job.
2. To help the students relate personality traits to work characteristics.
3. To help the students see the importance of choosing a career compatible with their personalities and with the work characteristics from which they will derive the most satisfaction.

4. To give students an understanding of the reasons why people choose their occupations.
5. To encourage students to formulate some reasons of their own for working and to take an active part in their career development (Freeman and Lidz, 1973a).

Day 5

The Discovery filmstrip "Thinking About Goals" was shown, and the Career Log exercise "Goals", page 51, and "Choosing Goals Wisely," pages 53-54, were discussed.

Goals

1. To stimulate students to a preliminary examination of goals related to career choices.
2. To show students the relationship between courses of study and career goals.
3. To encourage students to examine carefully the courses of study available in their own school system (Freeman and Lidz, 1973a).

Day 6

Discovery filmstrips "Looking at Career Fields" and "On the Road and in the Plant" were shown. Students were then given free time to examine career clusters of their choice via the "Popeye" comic series Career Awareness Program: Comics in the Classroom (King Features, 1972).

Goal

To acquaint students with specific U. S. Office of Education career clusters and to allow them to investigate the clusters of their choice.

Day 7

Discovery filmstrips "Other Career Fields" and "More Career Fields" were presented. Students were then given more free time to examine clusters via the "Popeye" comics.

Goal

To acquaint students with specific U. S. Office of Education career clusters and to allow them to investigate the clusters of their choice.

Day 8

The research assignment (Appendix D) was given to the students, followed by an explanation of the use of various sources of occupational information in the library (VIEW, Occupational Outlook Handbook, Dictionary of Occupational Titles, Desk-top Career Kit, the library's file cabinet of career pamphlets, books about specific occupations and encyclopedias). It was explained that the assignment must involve research, not just common sense answers. Students were asked to give the sources for their information.

Goal

To give students an explanation of sources of occupational information.

Days 9 and 10

Students' completion of the research assignment was facilitated by two counselors, one librarian and the English teacher assigned to the groups. The unit was summarized, and written comments from the students were solicited in regard to the unit.

APPENDIX D

RESEARCH ASSIGNMENT

Name _____

COMPLETE THE FOLLOWING EXERCISES FOR AN OCCUPATION ABOUT WHICH YOU WOULD LIKE TO LEARN:

1. What is the title of the occupation? _____
2. Describe what the worker does on the job.
3. What personality traits are important for the occupation?
4. What abilities are important for the occupation?
5. What are the physical demands of the job?
6. What training is required? Include high school courses that would be helpful and any training or school that might be necessary after high school.
7. What are the working hours for a person with the job? _____
8. What is the beginning salary a person could expect? _____
What is the average salary for people doing this work? _____
How recent are the above salary figures? _____
9. List some possible fringe benefits of the occupation.
10. What are the possibilities for advancement?

APPENDIX E

MEANS, STANDARD DEVIATIONS, AND CORRELATIONS

TABLE XIII
MEANS AND STANDARD DEVIATIONS

Variable	Mean	Standard Deviation	Cases
TMT	0.5000	0.5007	340
DAT	44.6676	18.3879	340
GA RHO	0.3721	0.3233	340
GR RHO	0.3550	0.3310	340
AR RHO	0.3248	0.3588	340
ATTITUDE SCALE	33.9412	5.2660	340
SELF-APPRAISAL	11.5088	4.0553	340
OCCUPATIONAL INFORMATION	14.9206	3.5792	340
GOAL SELECTION	12.4853	3.4619	340
PLANNING	12.2824	4.2038	340
PROBLEM SOLVING	9.2529	3.3552	340

TABLE XIV
CORRELATION COEFFICIENT MATRIX

	TMT	DAT	GA RHO	GR RHO	AR RHO
TMT	1.00000	-0.01362	0.02482	-0.03449	-0.06050
DAT	-0.01362	1.00000	0.19242	0.30155	0.23041
GA RHO	0.02482	0.19242	1.00000	0.33596	0.43585
GR RHO	-0.03449	0.30155	0.33596	1.00000	0.39837
AR RHO	-0.06050	0.23041	0.43585	0.39837	1.00000
ATTITUDE SCALE	0.19801	0.40378	0.07292	0.25359	0.14618
SELF-APPRAISAL	0.02397	0.55017	0.14765	0.28840	0.14267
OCCUPATIONAL INFORMATION	-0.06501	0.55130	0.15140	0.24902	0.24046
GOAL SELECTION	-0.00255	0.56422	0.17568	0.23577	0.17434
PLANNING	0.02382	0.53440	0.10907	0.18539	0.12957
PROBLEM SOLVING	0.00878	0.50962	0.06263	0.21468	0.13098

TABLE XIV (Continued)

	ATTITUDE SCALE	SELF APPRAISAL	OCCUPATIONAL INFORMATION	GOAL SELECTION	PLANNING	PROBLEM SOLVING
TMT	0.19801	0.02397	-0.06501	-0.00255	0.02382	0.00878
DAT	0.40378	0.55017	0.55130	0.56422	0.53440	0.50962
GA RHO	0.07292	0.14765	0.15140	0.17568	0.10907	0.06263
GR RHO	0.25359	0.28840	0.24902	0.23577	0.18539	0.21468
AR RHO	0.14618	0.14267	0.24046	0.17434	0.12957	0.13098
ATTITUDE SCALE	1.00000	0.42810	0.38976	0.38716	0.30550	0.39603
SELF APPRAISAL	0.42810	1.00000	0.55274	0.57279	0.53505	0.53880
OCCUPATIONAL INFORMATION	0.38976	0.55274	1.00000	0.65994	0.56965	0.58654
GOAL SELECTION	0.38716	0.57279	0.65994	1.00000	0.54390	0.52576
PLANNING	0.30550	0.53505	0.56965	0.54390	1.00000	0.54161
PROBLEM SOLVING	0.39603	0.53880	0.58654	0.52576	0.54161	1.00000

VITA

Richard Ervin Lampe

Candidate for the Degree of

Doctor of Education

Thesis: THE RELATIONSHIP OF SELECTED VARIABLES TO CAREER MATURITY INVENTORY SCORES

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