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The ability of career maturity indicators to predict interest score differentiation, consistency, and elevation among undergraduate students enrolled in a career/life planning course

Usher, Claire Jo Hamilton, Ph.D.

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U·M·I
300 N. Zeeb Rd.
Ann Arbor, MI 48106

THE ABILITY OF CAREER MATURITY INDICATORS TO PREDICT INTEREST SCORE DIFFERENTIATION, CONSISTENCY, AND ELEVATION AMONG UNDERGRADUATE STUDENTS ENROLLED IN A CAREER/LIFE PLANNING COURSE

by

Claire Jo Hamilton Usher

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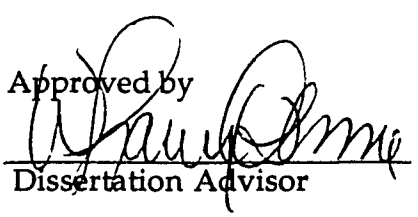

Dissertation Advisor

APPROVAL PAGE

This dissertation has been approved by the following committee of the Faculty of the Graduate School at The University of North Carolina at Greensboro.

Dissertation Advisor _____
Dr. W. Larry Osborne

Committee Members _____
Dr. Richard M. Jaeger

_____
Dr. James Benshoff

_____
Dr. Jonathan Tudge

_____
Dr. L. DiAnne Borders

August 21, 1992
Date of Acceptance by Committee

August 21, 1992
Date of Final Oral Examination

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The purpose of this research was to investigate relationships between the attitudinal and cognitive components of career maturity as assessed by the Career Development Inventory (CDI) and interest score differentiation, consistency, and elevation as assessed by the Strong Interest Inventory (SII). 252 undergraduate students enrolled in a career/life planning course at the University of North Carolina at Greensboro, 101 males and 151 females, comprised the sample.

Multiple regression analyses were conducted, with the CDI scales as predictor variables and the interest measures as dependent variables. The regression coefficients associated with corresponding career maturity measures for males and females did not differ significantly, making it unnecessary to examine separate regression equations for males and females. Gender differences in means for differentiation and consistency were found. Interest consistency was weakly predicted by Knowledge of One's Preferred Occupation (PO scale), and score elevation was weakly predicted by the Career Exploration (CE scale) and the PO scales. Differentiation was not predicted by any of the career maturity variables.

The main conclusion of the study was that for career counselors to focus on helping clients to increase career maturity in the areas assessed by the CDI would not necessarily lead to increased interest score differentiation, consistency, and elevation.

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CHAPTER I

INTRODUCTION

In college counseling centers and career planning and placement centers, a primary role of career counselors is to aid students in making choices among college majors or initial occupations. Counselors focus on helping traditional-aged students with the developmental tasks of identifying careers of interest, crystallizing their ideas about occupations that appeal to them, and developing the plans necessary to become established in a specified occupation (Super, Thompson, & Lindeman, 1988). Assessment of students' interests, therefore, becomes a primary activity in the counseling process, and this is accomplished primarily through the administration of some type of interest inventory, such as the Self-Directed Search (SDS) (Holland, 1979) or the Strong Interest Inventory (SII) (Campbell & Hansen, 1981).

Popularity of the Strong Interest Inventory

The Strong Interest Inventory (SII) is "one of the oldest and best known psychological tests in the country...that measures occupational interests in areas requiring advanced technical, college or post-graduate training" (Spitzer & Levinson, 1988, p. 678). In a survey of 630 randomly selected members of Division 17 (Counseling Psychology) of the American Psychological Association, the SII was cited as the most frequently used test in student counseling centers and the preeminent test of vocational interests (Watkins, Campbell, & McGregor, 1988). Respondents also mentioned the SII most frequently as the vocational test with which counseling psychology graduate

students should be familiar. Watkins (1990) also concluded that the SII is the vocational test most frequently taught in graduate-level assessment courses.

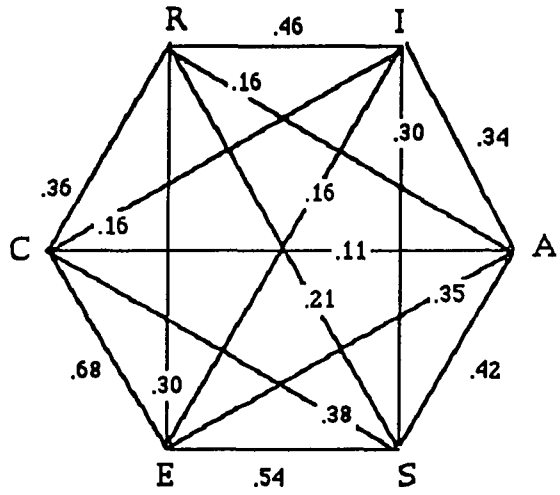
Holland's Theory of Careers

The SII yields General Occupational Theme (GOT) standard scores that measure the degree of one's interest in each of six areas identified by Holland. According to Holland (1973, 1985a), personality types (and occupational environments) can be classified into six types: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional. These six types are related to one another as depicted by Holland's hexagonal model (see Figure 1). Since pure personality types do not exist in reality, a three-letter code indicating the highest three of the six interest areas is commonly utilized to describe the personality of an individual.

Insert Figure 1 about here

Holland's theory of careers includes two important constructs particularly applicable to the interpretation of SII profiles: consistency and differentiation. Consistency generally refers to the degree of relatedness or similarity of one's interests and has been traditionally measured by the proximity of one's two highest interest areas on the Holland hexagon. For example, an individual with the Holland code of SEC (Social-Enterprising-Conventional) would have a more consistent profile of interests than someone with the code of ACR (Artistic-Conventional-Realistic), because of the positioning of the two highest types on the hexagon. That is, Social and Enterprising types have some interests in common, such as dealing with

Figure 1. Holland's hexagonal model of personality types and occupational environments.[1]



[1]Adapted from An Empirical Occupational Classification Derived from a Theory of Personality and Intended for Practice and Research, by J.L. Holland, D.R. Whitney, N.S. Cole, and J.M. Richards, Jr. ACT Research Report No. 29, The American College Testing Program, 1969.

people (they are adjacent to each other on the hexagon), whereas Artistic and Conventional personalities have few similarities (they are opposite on the hexagon).

Holland hypothesized that persons with inconsistent interests would be less predictable in their vocational outcomes because "they combine more diverse interests, competencies, values, and perceptions. As a result, they have a more extensive repertoire of possible behaviors" (Holland, 1985a, p. 49). Holland considers consistency to be the least influential of his constructs on poor vocational outcomes, such as poor job performance, dissatisfaction, and job instability. Nevertheless, he does consider inconsistency of interests to be related to vacillation of choices, poor choices of work environments, and ineffective functioning in compatible environments (Holland, 1985a, p. 56). In accordance with Holland's views, Wiley and Magoon (1982) found higher consistency of interests among 211 Social types to be associated with persistence in college and cumulative GPA. Other studies have found high consistency to be related to stability of vocational choice (O'Neil & Magoon, 1977; O'Neil, Magoon, & Tracey, 1978; Touchton & Magoon, 1977).

The second Holland construct particularly relevant to interest profile interpretation is differentiation. Holland defined differentiation as the degree to which a person resembles any one of the six interest types as compared to all the others (Weinrach & Srebalus, 1990). Holland (1973, 1985a) theorized that having highly differentiated interests, that is, closely resembling one or a few of the types, would be associated with more positive vocational outcomes such as higher vocational and educational achievement, job stability, and satisfaction. Traditionally, Holland (1973) proposed subtracting the lowest

from the highest score of the six types as a measure of differentiation, but this measure has generally not been correlated with more positive vocational outcomes as hypothesized by Holland (Monahan, 1987). Furthermore, in several studies that have found a differentiation effect on vocational outcomes, this relation has held for males but not for females (Holland, 1968; Peiser & Meir, 1978; Reuterfors, Schneider, & Overton, 1979).

Counseling Difficulties with Inconsistent and Undifferentiated Profiles

Students with inconsistent interest profiles, i.e., profiles that indicate several interests that have few commonalities with one another, present problems for the career counselor. Few occupations can provide opportunities in which these personalities can fully express themselves (Hansen & Campbell, 1985). In fact, inconsistent personality types are considered to be vocationally immature (Holland, 1985a). Therefore, an important question to be addressed is: Do students with inconsistent interests lack the vocational maturity considered necessary to make satisfying career choices?

An undifferentiated interest profile, a profile in which no clear preference is indicated for one or a few of the six areas, presents a challenge for the career counselor in aiding the student to make an accurate assessment of his or her interests. The counselor must determine whether the student lacks real interest in any of the six areas, is depressed, or is generally indecisive as some have speculated (Weinrach & Srebalus, 1990). Another hypothesis could be that the undifferentiated interest scores are reflecting a lack of vocational maturity, i.e., poor career planning and exploration

attitudes or a lack of experience with and knowledge of the world of work and careers.

In addition to the interpretation difficulties of these types of profiles, some problems for the counseling relationship have been suggested by Pinkney (1985, p. 31): (a) when little information is generated for the client from the undifferentiated profile, the counselor's credibility and competence may be questioned, (b) both counselor and client may become frustrated when nothing seems to be accomplished by the inventory results, and (c) the client may quickly conclude that the counselor and counseling have little to offer. In addition, the counselor may feel less competent when presented with these difficult cases. These problems represent potential threats to the effectiveness of career counseling and demonstrate the seriousness of the problem of undifferentiated and inconsistent profiles in practice.

The Relation Between Career Maturity and Interest Diagnostic Signs

According to Super (1990), career maturity is a multidimensional construct consisting of attitudes and knowledge that allow one to confront successfully the developmental tasks of each of the career development stages (exploration, establishment, maintenance, and disengagement). Attitudinal components of career maturity include such career planning and exploration attitudes as the willingness to utilize a variety of sources of information for career exploration. Cognitive or knowledge components include knowledge of career development principles, the ability to apply these principles to particular career decisions, knowledge of the occupational structure and what it takes to get and keep a job, and knowledge of one's particular field of interest.

Career maturity is viewed as a necessity for clients confronting the developmental tasks of the Exploration stage, which includes the clarification of interests (Super, 1990). By implication, career maturity also should be related to well-defined and integrated interests. In addition, Holland (1985a) asserted that a clarified and consistent interest pattern structure is a sign of vocational maturity. Thus, it would be reasonable to hypothesize that career maturity is related to the interest diagnostic signs of differentiation, consistency, and score elevation (i.e., liking many occupations, activities, school subjects, and types of people in one or more interest areas).

The Career Development Inventory to Measure Career Maturity

The Career Development Inventory (CDI) (Super, Thompson, Lindeman, Jordaan, & Myers, 1981), the instrument used to assess career maturity in this study, measures several attitudinal and cognitive aspects of career maturity: career planning attitudes (CP scale), career exploration attitudes (CE scale), decision-making skills (DM scale), knowledge of the world of work (WW scale), and knowledge of one's currently preferred occupational group (PO scale). The attitudinal scales (CP and CE) are measures of planfulness and the quality of exploratory attitudes (Thompson & Lindeman, 1981); the cognitive or knowledge scales (DM, WW, and PO) assess decision-making ability and career awareness and occupational knowledge (Thompson & Lindeman, 1981). Composite attitudinal (CP and CE) and cognitive (DM and WW) scales are yielded from the inventory, as well as a total career maturity index (COT; combination of CP, CE, DM, and WW scales).

Statement of the Problem

Few counseling strategies have been offered to deal with inconsistent and undifferentiated profiles from the SII. What is available has been directed toward the Strong Vocational Interest Blank (Athelstan, 1966; Frantz, 1972), but it is generally recognized that people with undifferentiated and inconsistent profiles are difficult to counsel (Strong, 1943; Weinrach & Srebalus, 1990). For undifferentiated clients on the SII, Pinkney (1985) suggested a card sort methodology based on the client's SII answer sheet in which the client is encouraged to discuss with the counselor the basis for responding "like" or "dislike" to the various occupational titles presented on the inventory. Hansen (1984) suggested using the highest of the scores with clients who have low-elevated and undifferentiated interest profiles. Counselors working with clients with inconsistent profiles have been encouraged to help these clients express some interests vocationally and some avocationally.

As a possible alternative to these approaches, this research study suggests that the Career Development Inventory (CDI) (Super, Thompson, Lindeman, Jordaan, & Myers, 1981), which assesses attitudinal and cognitive components of career maturity, may be useful in pointing counselors in some specific directions for working with clients who have low-elevated, inconsistent, or undifferentiated interest scores. If career maturity is a necessity for the development of a clear and well-integrated vocational identity and well-defined interests (Holland, 1985a; Super, 1990), then the willingness to explore and planful attitudes about one's career development, knowledge of career development principles, and occupational knowledge as

measured by the CDI should be associated with high-elevated, consistent, and well-differentiated vocational interests as measured by the SII.

More specifically, the delineation of which aspects of career maturity (i.e., attitudinal or cognitive) are related to consistency, differentiation, and elevation of interests should help counselors know where to focus their counseling efforts. Should counselors focus on helping clients with problematic types of SII profiles develop career planning and exploration attitudes, or acquire knowledge of career development principles and occupational and world-of-work information? This research addressed these questions and will potentially provide career counselors with some specific directions for counseling clients with low-elevated, inconsistent, and undifferentiated SII profiles.

Because previous studies of the relationship between Holland's constructs and vocational outcomes have often held for males but not for females, this research also represents an attempt to assess whether the interest pattern structures (i.e., differentiation, consistency, and score elevation) of male and female students are related in similar ways to career maturity. These results will be useful in demonstrating the applicability of Holland's and Super's career development perspectives for both men and women.

Purpose of the Study

The purpose of this study is to examine relationships between the attitudinal and cognitive aspects of career maturity, as measured by the CDI (career planning and exploration attitudes, knowledge of career development principles, and knowledge of the world-of-work), and consistency, differentiation, and score elevation as measured by the SII. Only a few studies

(Holland, Gottfredson, & Nafziger, 1975; Miller, 1982; Taylor, Kelso, & Power, 1986) were found that directly examined the relation between career maturity indicators and interest pattern structure. This study also investigates gender differences in this relation since Holland's constructs often have been found to be positively related to vocational outcomes for males but not for females (Holland, 1968; Peiser & Meir, 1978; Reuterfors, Schneider & Overton, 1979).

Only two studies examined score elevation in the context of differentiation (Erwin, 1987; Swanson & Hansen, 1986). Studies of differentiation that have found no relationship with vocational outcomes as hypothesized by Holland have been criticized for not taking into consideration the elevation of the scores in the interest profile. Undifferentiated subjects having low and high interest scores on all six Holland areas have been treated as a homogeneous group (Swanson & Hansen, 1986). Therefore, the present study extends previous work by examining score elevation in addition to the other variables of interest: consistency and differentiation.

Definition of Terms

Vocational interests have been defined as "constellations of likes and dislikes, and as positive and negative reactions to stimuli" (Super & Crites, 1962). In the context of this study, interests will be assessed through the use of a standardized interest inventory, the Strong Interest Inventory (SII). The SII yields an interest profile, or a set of scores that reflects the degree of interest one has in the six areas comprising Holland's typology of personalities and environments. This typology consists of the Realistic, Investigative, Artistic, Social, Enterprising, and Conventional interest areas. The three highest

scores from an interest profile are referred to as the three-letter Holland code. The six areas are arranged in a hexagonal model, developed on the basis of intercorrelations between pairs of the six types, with the positioning of the six interest areas on the hexagon indicating the degree of commonality they have with one another. That is, interest areas adjacent to each other on the hexagon are considered to have the greatest similarity to one another, while those opposite on the hexagon are thought to have little in common.

Interest pattern structure, in this study, refers to the degree of consistency, differentiation, and score elevation represented in an interest profile, also referred to as diagnostic signs. Consistency is traditionally defined by the degree of similarity between one's two highest interest areas, as indicated by their relative positions on Holland's hexagon. For example, Social and Enterprising areas have more commonalities than the Artistic and Conventional areas, as represented by their positions on the hexagon. Differentiation is the degree to which a profile reflects interest in one or a few areas, as opposed to all six areas. A profile can indicate that a person resembles one or a few types to the exclusion of the others (differentiated), or that a person bears equal resemblance to all six types (undifferentiated). Score elevation is indicative of the number of "like" responses that a person has made to the various occupations, activities, school subjects, and types of people associated with the six interest areas. Highly-elevated interest scores are made by people who like many of the different elements comprising the interest areas.

Holland's constructs of consistency and differentiation have been hypothesized to be positively related to vocational outcomes, such as job

satisfaction, job stability, and achievement indicators (Holland, 1973, 1985a). These constructs have also been viewed as indicators of vocational or career maturity, a multidimensional construct that is defined by Super (1990) as the ability to cope with the developmental tasks required at different career development stages. Career maturity has both attitudinal and cognitive components. Attitudinal components include career planning and exploration attitudes such as the willingness to use a variety of career resources for exploration and finding these resources helpful when used, while cognitive components consist of knowledge of career development principles and decision-making skills, knowledge of what it takes to obtain a job and succeed at one, and accurate information about the occupation that one is considering at a particular time.

Research Questions

The following research questions will be addressed. Among undergraduate students enrolled in a career/life planning course:

1. Is gender an important predictor of differentiation of interests, as measured by the SII?

2. How well can attitudinal and cognitive aspects of career maturity, as measured by the CDI (the CP, CE, DM, WW, and PO scales together), predict differentiation of interests, as measured by the SII?

3. Which of the attitudinal and cognitive aspects of career maturity, as measured by the CDI (the CP, CE, DM, WW, and PO scales), predict differentiation of interests, as measured by the SII?

4. Is gender an important predictor of consistency of interests, as measured by the SII?

5. How well can attitudinal and cognitive aspects of career maturity, as measured by the CDI (the CP, CE, DM, WW, and PO scales together), predict consistency of interests, as measured by the SII?

6. Which of the attitudinal and cognitive aspects of career maturity, as measured by the CDI (the CP, CE, DM, WW, and PO scales), predict consistency of interests, as measured by the SII?

7. Is gender an important predictor of elevation of interests, as measured by the SII?

8. How well can attitudinal and cognitive aspects of career maturity, as measured by the CDI (the CP, CE, DM, WW, and PO scales together), predict elevation of interests, as measured by the SII?

9. Which of the attitudinal and cognitive aspects of career maturity, as measured by the CDI (the CP, CE, DM, WW, and PO scales), predict elevation of interests, as measured by the SII?

Research Hypotheses

Among undergraduate students enrolled in a career/life planning course:

1. When the CDI is used to predict differentiation of interests, as measured by the SII, the corresponding regression coefficients of the CDI scales (CP, CE, DM, WW, and PO) will not differ significantly for males and females.

2. Mean differentiation of interest scores of males and females, as measured by the SII, will not differ significantly.

3. Attitudinal and cognitive aspects of career maturity, as measured by the CDI (CP, CE, DM, WW, and PO scales together), will predict a significant

proportion of the variance in differentiation of interests, as measured by the SII.

4. In the context of a multiple regression model, each of the CP, CE, DM, WW, and PO scales from the CDI will be a significant predictor of differentiation of interests, as measured by the SII.

5. When the CDI is used to predict consistency of interests, as measured by the SII, the corresponding regression coefficients of the CDI scales (CP, CE, DM, WW, and PO) will not differ significantly for males and females.

6. Mean consistency of interest scores of males and females, as measured by the SII, will not differ significantly.

7. Attitudinal and cognitive aspects of career maturity, as measured by the CDI (CP, CE, DM, WW, and PO scales together), will predict a significant proportion of the variance in consistency of interests, as measured by the SII.

8. In the context of a multiple regression model, each of the CP, CE, DM, WW, and PO scales from the CDI will be a significant predictor of consistency of interests, as measured by the SII.

9. When the CDI is used to predict elevation of interests, as measured by the SII, the corresponding regression coefficients of the CDI scales (CP, CE, DM, WW, and PO) will not differ significantly for males and females.

10. Mean elevation of interest scores of males and females, as measured by the SII, will not differ significantly.

11. Attitudinal and cognitive aspects of career maturity, as measured by the CDI (CP, CE, DM, WW, and PO scales together), will predict a significant proportion of the variance in elevation of interests, as measured by the SII.

12. In the context of a multiple regression model, each of the CP, CE, DM, WW, and PO scales from the CDI will be a significant predictor of elevation of interests, as measured by the SII.

These hypotheses are derived from Holland (1973, 1985a), who postulates that greater levels of interest consistency and differentiation are signs of greater levels of vocational maturity. Also, Super (1990) asserts that greater levels of career maturity are necessary for a clear, stable, and well-integrated vocational self-concept, which should be reflected by more consistent, differentiated, and elevated vocational interests. Gender differences in the relationships between career maturity indicators and these interest diagnostic signs are not hypothesized, because there is no theoretical basis for expecting that the process of interest pattern development is different for males and females. Furthermore, differences in the means on these interest measures are not hypothesized for males and females, because most studies that have examined this question have not found statistically significant gender differences (e.g., Slaney, 1980; Spokane & Walsh, 1978).

Summary

Assessment of students' interests through the use of an inventory such as the Strong Interest Inventory (SII) is a major component of the career counselor's role in college counseling centers and career planning and placement centers. When students present low-elevated, inconsistent, or undifferentiated profiles on the SII, there are few strategies available to guide the counselor's efforts, resulting in a possible deterioration of the counseling relationship and the potential for negative client outcomes.

From both Holland's and Super's theoretical perspectives, career maturity should be related to consistency, differentiation, and elevation of vocational interests. Holland views consistency and differentiation as indicators of vocational maturity; Super sees career maturity as a requirement for confronting successfully the traditional-aged college student's developmental task of clarification of vocational interests.

This study first examined the possibility of gender differences in the relationships between the attitudinal and cognitive aspects of career maturity, as assessed by the Career Development Inventory, and the interest diagnostic signs of differentiation, consistency, and elevation, as assessed by the Strong Interest Inventory. More specifically, through the use of multiple regression analyses, the statistical significance of the incremental proportion of variance in each interest measure explained by gender-career maturity interactions was examined. Then, gender differences in means on each interest measure were examined by testing the significance of the regression coefficient associated with the (coded) gender variable.

Next, the ability of the career maturity measures to predict the elevation, consistency, and differentiation of interests was examined. In particular, the proportion of variance of each interest measure explained by the career maturity variables was estimated. The regression coefficient of each career maturity variable was examined for statistical significance.

The results of this study have the potential to guide counselors' efforts in working with clients who have undifferentiated, inconsistent, or low-elevated interest profiles. More specifically, should counselors emphasize the development of career planning and exploration attitudes or the acquisition

of knowledge about career development principles and the world of work, or are both aspects equally important in the clarification and integration of vocational interests?

This study extends previous research, reviewed in the next chapter, by: (a) examining score elevation in addition to the consistency and differentiation constructs addressed in other studies; (b) utilizing measures of differentiation, consistency, and score elevation that take into account more of the information provided by the interest profile than has been accounted for by previous measures; (c) accounting for the correlations between the interest areas in the measure of consistency; and, (d) examining the possibility of gender differences in relationships between indicators of career maturity and interest pattern structure variables. Not only do the results have the potential to provide practical information for specific counseling interventions for students with inconsistent, undifferentiated, or low-elevated interests, but they also provide additional information concerning the applicability of Super's and Holland's theories for both males and females.

In the following chapter, literature pertinent to Holland's constructs of differentiation and consistency, as they relate to career maturity, is reviewed. These few correlational studies suggest that exploratory behavior and decision-making ability are related to interest pattern structure. Two studies are reviewed that suggest the importance of examining score elevation in interest profile interpretation. Some studies indicated that gender differences should be examined, because often, the hypothesized relations between Holland's constructs and vocational outcomes hold only for males. In

addition, the inadequacies of traditional measures of differentiation, consistency, and score elevation are delimited.

CHAPTER II

REVIEW OF THE LITERATURE

In this chapter, literature is first reviewed that provides a rationale for focusing on two of Holland's theoretical constructs, consistency and differentiation, as vocational interest diagnostic signs. Second, the inadequacies of previously-developed measures of these constructs are described.

Next, the construct of career maturity is presented and literature describing the theoretical context for hypothesizing that career maturity indicators are related to the interest diagnostic signs of differentiation, consistency, and score elevation is reviewed. The few correlational studies investigating the relation between career maturity and differentiation and consistency are then discussed.

Finally, studies that suggest the importance of examining (a) gender differences in the relation between career maturity and interest diagnostic signs, and (b) score elevation in addition to differentiation and consistency are reviewed.

Holland's Constructs of Differentiation and Consistency

The first basic premise of Holland's position is that both people and occupational environments can be classified by their resemblance to each of six types: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional. Coming from a social learning perspective, Holland viewed a variety of influences, including interaction with "peers, biological heritage,

parents, social class, culture, and the physical environment" (Holland, 1985a, p. 2) as responsible for the development of the types:

> Out of this experience, a person learns first to prefer some activities as opposed to others. Later, these activities become strong interests; such interests lead to a special group of competencies. Finally, a person's interests and competencies create a particular personal disposition that leads him or her to think, perceive, and act in special ways. (Holland, 1985a, p. 2)

Holland (1985a) described the Realistic type of personality as having a "preference for activities that entail the explicit, ordered, or systematic manipulation of objects, tools, machines, and animals" and "an aversion to educational or therapeutic activities" (p. 19). These types are competent in manual, mechanical, agricultural, electrical, and technical activities, but lack competence in social and educational endeavors. They value money, power and status, and describe themselves as conforming, genuine, materialistic, persistent, practical, and thrifty (Holland, 1985a). Some primarily Realistic occupations listed in The Occupations Finder (Holland, 1978) include landscape architect, forester, mechanical engineer, locksmith, fire fighter, vocational agriculture teacher, carpenter, and truck driver.

The Investigative type of personality has a "preference for activities that entail the observational, symbolic, systematic, and creative investigation of physical, biological, and cultural phenomena" and an "aversion to persuasive, social, and repetitive activities" (Holland, 1985a, pp. 19-20). Science and mathematics are strong competencies; these types lack skills in persuasive and enterprising activities. Investigative types describe themselves as analytical, critical, curious, intellectual, precise, reserved, and

lacking in leadership ability. A sample of Investigative occupations includes economist, chemist, mathematics teacher, dentist, psychiatrist, actuary, surgeon, zoologist, civil engineer, and airplane pilot.

Preferences of the Artistic person are "ambiguous, free, unsystematized activities that entail the manipulation of physical, verbal, or human materials to create art forms or products"; their aversions are to "explicit, systematic, and ordered activities" (Holland, 1985a, p. 20). Artistic personalities' competencies lie in the various art forms, while they tend to be deficient in clerical and business skills. Aesthetics are highly valued by Artistic types, and they describe themselves as expressive, original, nonconforming, independent, intuitive, and introspective. Artistic occupations include actor/actress, writer, music teacher, advertising manager, interior decorator, architect, and photographer.

Social personality types like to inform, train, develop, cure, or enlighten other people and dislike "explicit, ordered, systematic activities involving materials, tools, or machines" (Holland, 1985a, p. 21). Their strengths lie in interpersonal and educational skills; they are weak in manual and technical competencies. Social types describe themselves as cooperative, friendly, helpful, empathic, persuasive, sociable, and understanding. Host/hostess, history teacher, recreation supervisor, ticket agent, athletic coach, clinical psychologist, counselor, and minister are classified as primarily Social occupations.

Enterprising types enjoy activities that "entail the manipulation of others to attain organizational goals or economic gain" (Holland, 1985a, p. 21) and dislike those activities that are observational, symbolic, or systematic.

Enterprising personality types are skilled in leadership, interpersonal relations, and persuasion, but lack competencies in scientific activities. They tend to value political and economic gain, and are likely to describe themselves as aggressive, popular, self-confident, sociable, ambitious, energetic, and optimistic. Some examples of Enterprising occupations are bank president, insurance underwriter, real estate agent, office manager, sales clerk, retail merchant, and attorney.

The Conventional personality prefers activities that involve the explicit, ordered, and systematic manipulation of data; they have an "aversion to ambiguous, free, exploratory, or unsystematized activities" (Holland, 1985a, p. 22). Thus, they develop competencies in clerical, computational, and business activities and are deficient in artistic pursuits. Conventional types value economic achievement and can be expected to be conforming, conscientious, efficient, methodical, orderly, practical, and persistent. A sample of Conventional occupations includes keypunch operator, file clerk, certified public accountant, business teacher, bookkeeper, cashier, and financial analyst.

These six ideal or pure types do not exist in reality; rather, people resemble each of these types to a greater or lesser extent. In other words, the individual's greatest resemblance to three of the types can be descriptive of the personality. Thus, people can be classified by their three highest codes obtained from an interest inventory that assesses the resemblance to each of the six Holland types, such as the Vocational Preference Inventory (VPI) (Holland, 1985b), the Self-Directed Search (SDS) (Holland, 1979), and the Strong Interest Inventory (SII) (Campbell & Hansen, 1981).

Holland (1973, 1985a) postulated that the six personality types form a hexagon that illustrates their similarity to each other (see Figure 1, p. 3). This hexagonal model, developed on the basis of intercorrelations between the six types assessed by the Vocational Preference Inventory, suggests that those types that are adjacent to one another on the hexagon are most similar and that those opposite one another are most dissimilar. Thus, for example, Realistic and Investigative personality types resemble each other to a great degree whereas Realistic and Social types have few characteristics in common.

Holland (1985a) cited much evidence to support the description and distinctiveness of the types. For example, sampling a large group of college freshmen from 28 colleges, Holland (1968) found that students classified by their types as indicated by the Vocational Preference Inventory (VPI) differed substantially on 22 competency, life goal, self-rating, personality, and attitudinal variables in expected ways. Abe and Holland (1965) classified 12,432 college freshmen by their vocational aspirations and compared them on 117 variables. "In general, many comparisons resulted in large mean differences that were consistent with the formulations for the personality types" (Holland, 1985a, p. 62). Williams (1972) sampled 145 male graduate students from 18 departments, assessed their type from the Vocational Preference Inventory (VPI), and was able to correctly classify the field of study of 93 of them based on personality and values information. Holland (1985a) purported that the large number of correlational studies of the VPI with personality inventories, such as the Guilford-Zimmerman Temperament Survey (Guilford & Zimmerman, 1949), the California Psychological Inventory (Gough, 1957), and the 16 Personality Factor Questionnaire (Cattell,

Eber & Tatsuoka, 1970), also supports descriptions of the types. These correlations are available in the VPI manual (Holland, 1977).

Evidence that values are consistent with the characteristics of types has suggested that some types are more distinctive than others (Astin & Nichols, 1964; Baird, 1970; Laudeman & Griffith, 1978; Williams, 1972): Enterprising and Conventional types share political and economic values, and Realistic and Investigative types usually value science (Holland, 1985a). Characteristic abilities and competencies also have been associated with the types, and it has been demonstrated that types adjacent on the hexagon share similar competencies (Holland, 1968; Kelso, Holland, & Gottfredson, 1977). However, the correlations between competencies and types have been small to moderate (Holland, 1985a).

Another major contribution of Holland's work (1985a) has been the delineation of four characteristics of the person and occupational environment that are hypothesized to be related to positive vocational outcomes (e.g., career stability over the life span, greater levels of accomplishment, higher levels of career involvement and satisfaction): degrees of congruence, consistency, differentiation, and identity. Of these four, only consistency and differentiation are relevant to interest profile interpretation; therefore, these are the only two that are addressed in this study. Identity, consistency, and differentiation are all concerned with the clarity, definition, or focus of the personality types (and environments), so that Holland believes they all probably represent three techniques for assessing the same concept (Holland, 1985a; Holland, 1987). Although Holland also applies these constructs to the environment, they are discussed

here only in terms of the personality pattern, because the clarity of vocational interests, not the occupational environment, is the focus of this research.

Holland (1985a) asserted that having high levels of congruence, consistency, differentiation, and identity are additively related to the probability of achieving positive vocational outcomes, while low levels of these characteristics are related to lower achievement, job dissatisfaction, and job instability. He believed that congruence is the most important variable, followed by differentiation and then consistency. The evidence for the identity construct is just beginning to accumulate (Holland, 1985a). All of these measures are "positively correlated and intellectually similar" (Holland, 1985a, p. 51), but studies investigating them separately have found mixed results for their association with vocational outcomes. Therefore, Holland has retained all of the concepts as distinct constructs until the empirical evidence is more conclusive. Nevertheless, he defines vocationally mature people as those who have consistent and differentiated interest profiles, and who can name a specific role they want to take in their chosen occupation (Holland, 1985a).

One of Holland's constructs ascertainable from an interest inventory profile is consistency. Consistency of a person's personality pattern "represents an integration of similar interests, competencies, values, traits, and perceptions" (Holland, 1985a, p. 49). According to Holland, a person with a three-letter code of RIA would have a more consistent personality than one with a code of RSE, because of the position of the two highest interest types on the hexagon; that is, R and I are adjacent on the hexagon while R and S are opposite on the hexagon (see Figure 1, p. 3).

Another diagnostic sign ascertainable from an interest inventory profile is differentiation of vocational interests. According to Holland (1985a), differentiation refers to "the magnitude of the difference between highest and lowest scores on the six variables used to determine a person's . . . degree of resemblance to a personality type . . . " (p. 49). The greater the difference between these scores, the greater the degree of differentiation. Thus, a highly differentiated person will show high resemblance to one or a few types and low resemblance to the others; in other words, this person has more clearly defined interests.

Inadequacies of Traditional Measures of Consistency and Differentiation

Consistency has traditionally been measured by the hexagonal position of the two highest codes from an interest profile (Frantz & Walsh, 1972; Greenlee, Damarin, & Walsh, 1988; Holland, 1968, 1973; Holland, Gottfredson, & Nafziger, 1975; Magnussen & Stewin, 1990; Melamed, 1986; O'Neil, 1977; Reuterfors, Schneider & Overton, 1979; Slaney, 1980; Swanson & Hansen, 1986). For example, if the two highest interest areas were adjacent on the hexagon, the personality would be considered highly consistent; if they were separated by an intervening position, the personality would be moderately consistent, and if the areas were opposite on the hexagon, the personality type would be inconsistent (e.g., Holland, Gottfredson, & Nafziger, 1975; Melamed, 1986; O'Neil, 1977; Reuterfors, Schneider & Overton, 1979; Swanson & Hansen, 1986). Others have examined the relative positioning on the hexagon of combinations of types from the three-letter Holland code (Healy et al., 1984; Swaney & Prediger, 1985). These methods, however, do not take into account the actual correlations between the interest areas (Rose & Elton, 1982,

and Villwock, Schnitzen, & Carbonari, 1976, are exceptions), which, in some cases, reflect a different relation between the types than what is postulated by the hexagonal model (see Figure 1, p. 3).

Gati (1985) proposed another measure that incorporates the consistency construct, labelled "interest crystallization." This term refers to "the degree to which the fields preferred by the individual indicate a definite orientation toward a specific field or a group of adjacent fields" (Gati, 1985, pp. 38-39). This measure considers the scores of the significant fields in the profile (these are variable in number; but, for Holland's typology, the maximum number of relevant fields is arbitrarily set at 4 (Gati, 1987)); however, the salient fields must first be determined by an algorithm and a hexagonal or hierarchical model of interests (Gati, 1979) must be assumed. This measure also does not take into account the actual correlations between the six interest areas.

Previous measures of differentiation also suffer from limitations. Several researchers (e.g., Erwin, 1987; Frantz & Walsh, 1972; Gottfredson & Holland, 1990; Holland, 1968, 1973; Melamed, 1986; O'Neil, 1977; Reuterfors, Schneider, & Overton, 1979; Rose & Elton, 1982; Slaney, 1980; Spokane & Walsh, 1978; Swanson & Hansen, 1986; Taylor, Kelso, & Power, 1986; Wiggins, 1984; Wiggins et al., 1983) have used the traditional method suggested by Holland, subtracting the lowest from the highest of the six scale scores on an interest inventory (e.g., the Vocational Preference Inventory, the Self-Directed Search, the ACT Interest Inventory, or the Strong-Campbell Interest Inventory). This measure, however, ignores all the interest scores between the highest and lowest scores. For example, subtracting the lowest from the highest scores, these RIASEC profiles, (a) 20,80,80,80,80,80 and (b)

20,20,20,20,20,80, would be assigned the same differentiation score. Clearly, however, profile (b) should be considered more highly differentiated than profile (a). In addition, it is generally accepted that this method has not been useful in predicting vocational outcomes as Holland hypothesized (Holland, 1973; Monahan, 1987).

Subtracting the third-highest scale score from the highest score of a three-letter code has been offered as an alternative, based on the notion that the three highest scores are the most salient (Holland, Gottfredson, & Nafziger, 1975; O'Neil, 1977; Spokane & Walsh, 1978). This method, however, ignores the middle score in a three-letter code and assumes an arbitrary rule of thumb as to which scores are salient (Gati, 1987). Using this method, for the RIASEC profiles of (a) 80,60,30,20,20,20 and (b) 80,35,30,20,20,20, the RIA scores would be considered salient, while it could be argued that in profile (a) only the R and I scores are salient and in profile (b), only the R score is important (Gati, 1987).

For another operational definition of differentiation, Monahan (1987) suggested using the difference between the two highest scale scores, arguing that this measure more closely approximates Holland's theoretical conception of differentiation as similarity to a single type. This measure has been found to be more useful than the traditional method (Frantz & Walsh, 1972); however, it uses only two scores from a six-score profile and would assign equal differentiation scores to these RIASEC profiles: (a) 80,60,20,20,20,20 and (b) 80,60,60,60,60,60. Again, profile (a) should obtain a higher differentiation score.

Iachan (1984) developed two mathematically-sophisticated measures of differentiation: one uses information from the first-, second-, and fourth-highest scores in the profile; the other, the first-, third-, and fifth-highest scores. These measures still use only three scores from the interest inventory profile and assign equal differentiation scores to profiles resembling one, two, or three types. Another alternative suggested by Gati (1985), a measure of "interest crystallization," combines the consistency and differentiation constructs into a single measure, yet it is problematic because (a) it requires the use of an algorithm to determine the salient fields in the profile, (b) using Holland's typology, a maximum of 4 fields can be considered salient (Gati, 1987), (c) one must decide if the hexagonal or hierarchical model of interests is more appropriate, and (d) it does not consider the actual correlations between interest areas.

In a comparison of various indices of differentiation, Alvi, Khan, and Kirkwood (1990) correlated five measures of differentiation obtained from the Self-Directed Search (SDS) (Holland, 1979) for a sample of Canadian high school students and a sample of Pakistani students: Iachan's two indices, Holland's traditional measure of the difference between the highest and lowest of the six interest scores, the difference between the third-highest and the highest scores, and the difference between the two highest scores. They concluded that Iachan's indices should be preferred over the others, but the difference between the third-highest and the highest score is suitable if one is interested in the differentiation of the three-letter Holland code. However, none of the measures were superior in terms of their correlations with a measure of career decidedness (none were even moderately related to scores

on the Career Decision Scale (Osipow, 1980)). On the other hand, Gottfredson and Holland (1990) concluded that Iachan's measure of differentiation was not superior to Holland's traditional measure of subtracting the lowest from the highest of the six scores. In their study, the traditional measure was more highly correlated with job persistence.

Monahan (1987, p. 225) suggested that there may be no one correct way to compute differentiation, and that the various measures assess different aspects of the same construct. At most, previous measures have been based on three scores from a six-score interest profile and reflect various conceptual definitions of differentiation (e.g., resemblance to a single type, differentiation among one's highest interest scores only). A measure is needed that takes into account more information in the interest profile and is conceptually more inclusive. Monahan (1987) suggested that the measure that proves to have the greatest predictive validity for vocational outcomes will be the most useful.

Career Maturity and Its Hypothesized Relation to Interest Pattern Structure

In order to confront the developmental tasks of each career development stage successfully, persons need to possess vocational or "career maturity" (Super, 1990). This concept is defined as "the individual's readiness to cope with the developmental tasks with which he or she is confronted" (Super, 1990, p. 213). The degree of career maturity is presumed to affect the quality of decision-making at each developmental stage (Osipow, 1990).

Super (1990) viewed changes in one's vocational preferences, competencies, life and work situations, and self-concepts as proceeding

through a sequence of stages. However, "the stages tend to overlap and are not clearly defined by age limits" (Super, 1990, p. 214-215). As persons progress through these stages during the lifespan, the various life roles of student, worker, homemaker, citizen, and leisurite take on more or less importance.

In the developmental process throughout the lifespan, the first stage relevant to one's career development is the Exploration stage, typically associated with persons in the age range of 15 to 25. This period is marked by the developmental tasks of learning more about one's opportunities in the work world, clarifying one's ideas about what line of work he or she is best suited for, and getting started in that chosen occupation (Super, Thompson, & Lindeman, 1988).

The second stage of Establishment, which typically encompasses the early adulthood years of 25 to 45, involves becoming more stabilized and consolidated in one's chosen line of work and becoming involved in avenues of advancement in one's occupation (Super, Thompson, & Lindeman, 1988).

Maintenance, the third developmental stage, requires the adult to hold on to his or her position, update knowledge and skills required in the field, and become more innovative (Super, Thompson, & Lindeman, 1988). This stage is typically encountered by persons in the 45 to 65 age-group.

Finally, the last developmental stage, referred to as Disengagement, is confronted by persons in their retirement years, approximately age 60 and older. The tasks of this stage include cutting back on work activity, planning for retirement, and finding ways to enjoy retirement living (Super, Thompson, & Lindeman, 1988).

Super asserted that persons in different age groups confronting various developmental tasks may recycle through the earlier stages of career development. For example, workers in their late 30's or early 40's may become dissatisfied with their work situations or may find themselves unemployed due to economic lay-offs and may begin a process of exploration again in order to determine a new career direction for themselves. Recycling again to exploration "appears in the form of conventional, unstable, or multiple-trial careers and in so-called midcareer crises" (Super, 1990, p. 237).

Career maturity consists of two components: an affective or attitudinal dimension, and a cognitive or knowledge-based dimension (Super & Overstreet, 1960; Thompson & Lindeman, 1981). The attitudinal component includes the willingness to engage in career exploration, planfulness, and finding sources of career information useful, while the cognitive component includes knowledge of the principles of career decision-making and the ability to apply them to actual choices, knowledge of the nature of the work world, and knowledge of one's own field of interest (Super, 1990). The Career Development Inventory (CDI) (Super, Thompson, Lindeman, Jordaan, & Myers, 1981) was developed to assess these two components of career maturity.

The notion of self-concept is central to Super's view of career development. Basically, the process of career development is the clarification and implementation of self-concepts. In addition to such aspects of self-concept as self-esteem, self-efficacy, and role self-concepts (including role salience) which are important to career development, vocational interests are viewed as expressions of one's self-concept (c.f., Bordin, 1943). These interests

are learned in interaction with people, objects, facts, and ideas (Super, 1990). Since the clarification of interests, as a manifestation of self-concept, is one of the developmental tasks of the Exploration stage, and career maturity is required to meet the developmental tasks of the various life stages, then career maturity should be related to well-defined and consistent interests.

Osipow (1983) reviewed research concerning career maturity and its relation to vocational outcomes. This review included Super, Kowalski, and Gotkin's study (1967) of a sample of men at 25 years of age who had been followed since the ninth grade (Super & Overstreet, 1960). They concluded that vocational maturity in the ninth-grade predicted career satisfaction, self-improvement, and occupational satisfaction, was not related to economic self-sufficiency or the ability to get and hold a job, and was negatively related to early establishment in a career.

Osipow (1983) cited research that might explain these findings. Montesano and Geist (1964) found that twelfth-grade boys were more reflective in their reasons for interests (they were more concerned with vocational opportunities, career information, and the social value of careers) than ninth-grade boys who relied more on simple affect or interests for occupational choices. However, Thompson and Lindeman (1981) and Tilden (1978) argued that career maturity does not necessarily increase with age. Finally, it is generally concluded that an intelligence factor is involved in career maturity (Super & Overstreet, 1960; Osipow, 1983).

Empirical Studies of the Relation Between Career Maturity and Consistency and Differentiation

Much research has demonstrated that Holland's constructs of differentiation, consistency, and congruence are positively associated with one another. For example, Frantz (1972) found that male clients with undifferentiated profiles on the Strong Vocational Interest Blank (Strong & Campbell, 1966) tended to have inconsistent interests and that, for both males and females, those with undifferentiated profiles tended to be employed in occupations that were not congruent with their interests. Only a few studies, however, have directly investigated the relation between Holland's constructs of consistency and differentiation of interests and career maturity indicators.

Specifically, Miller (1982) investigated the relation between exploratory behaviors and attitudes and interest diagnostic signs; Holland, Gottfredson, & Nafziger (1975) examined the correlation of differentiation and consistency with decision-making ability and self- and occupational knowledge; and Taylor, Kelso, & Power (1986) investigated the relation between differentiation and occupational knowledge. In addition, in a longitudinal study, Taylor, Kelso, and Power (1986) found that differentiation in a sample of 490 Australian high school students increased over a time period of one year, indicating that "with greater experience, individuals acquire a better basis for choosing among vocational options" (p. 117). The nature of that experience which leads to a more clarified interest pattern structure is a significant research question.

Empirical work investigating the nature of exploration and its influences on vocational outcomes is only beginning to emerge (Grotevant, Cooper, & Kramer, 1986). Several people, however, have suggested that a lack of career exploration or a lack of knowledge about careers is one contributor to "flat profiles" or low interest scores from interest inventories (Pinkney, 1985; Spitzer & Levinson, 1988). If interest pattern development is largely a result of past experience, as Campbell and Hansen (1981), Holland (1985a), and Super (1990) have suggested, then if that experience has been limited, the development of clear, well-integrated and well-defined interests may be hindered (Miller, 1982). Jordaan (1963) suggested that exploratory behavior would result in a better defined and more integrated self-concept, and greater differentiation of interests (Miller, 1982).

> [Information-seeking behavior] enables engagement with reality, tests that reality against one's own image of the world, and revises and refines these pictures of self and of occupations to develop a more differentiated and integrated, and hence more mature and 'realistic,' cognitive map of the career world, oneself, and the possible relationships between self and career. (Starishevsky & Matlin, 1963, as cited in Miller, 1982, p. 33)

Some evidence that exploratory behavior is related to differentiation and integration of interests was found by Miller (1982). He administered the Strong-Campbell Interest Inventory (SCII) (Campbell, 1974b) to 22 male and 26 female community college students who had requested career counseling services. Differentiation was measured by adding the range of scores on the General Occupational Themes to the range of scores on the Basic Interest Scales (Ohlde, 1979), resulting in a measure that reflected the magnitude of

differentiation found on these two sections of the SCII. The construct of "interest integration" was measured by adding the number of High and Very High scores on the Basic Interest Scales to the number of Similar and Very Similar scores on the Occupational Scales (Ohlde, 1979). A new variable, "interest pattern maturity," was created by adding the differentiation score (weighted by .8) to the integration score. "The factor of 0.8 was used to balance the relative contributions of differentiation and integration variances to the variance of interest pattern maturity" (Miller, 1982, p. 30). Exploratory behavior, or information-seeking, was assessed by asking the students which of 20 sources of information they used in the past year. Miller (1982) found that using more sources of information was significantly positively correlated with all the interest pattern variables, but most highly with the composite variable. Thus, students who had used more sources of information had more differentiated and integrated interests.

Holland, Gottfredson, and Nafziger (1975) found evidence that consistency and differentiation are related to a form of decision-making ability, one indicator of career maturity. They were interested in a variety of outcomes associated with consistency and differentiation: self-knowledge, occupational knowledge, and decision-making ability. Samples of 1005 high school juniors, 692 college juniors and 140 employed adults were administered the Self-Directed Search (SDS) (Holland, 1972). Consistency scores of 3, 2, or 1 were assigned based on the position on the hexagon of the two highest summary scores. Differentiation was defined as the difference between the highest and lowest scores on the SDS. Consistency and differentiation were found to be related to scores on a translation task, or a

measure of a person's ability to select occupations congruent to his or her interests. (Subjects were asked to list all the jobs or occupations he or she could do and would like given no restrictions of money, training, or opportunity to obtain the job). This ability is presumed to reflect one aspect of decision-making ability. However, consistency and differentiation were not related to measures of self-knowledge or occupational knowledge, as measured by the Career Maturity Inventory (Crites, 1973).

Taylor, Kelso, and Power (1986) reported results from the Melbourne Careers Project in Australia of 185 "low differentiation" 10th grade high school students and 171 "high differentiation" students, differentiation having been defined by subtracting the lowest from the highest score on the Vocational Preference Inventory (VPI). This study found support for a relation between differentiation and the attitudinal and cognitive aspects of career maturity. Highly differentiated students scored significantly higher on a) consistency, congruence of VPI high score with expressed occupational choice, and VPI scores associated with confidence and optimism, and b) occupational knowledge as measured by the ability to list more jobs as future possibilities and consult more people for advice about careers. In a stepwise multiple regression analysis predicting differentiation scores, 35 percent of the variance in differentiation was attributed to VPI scores on acquiescence, congruence, and the number of future job possibilities listed by the student.

These few correlational studies suggest that the clarity and integration of interests may be related to various career maturity indicators: exploratory behavior (Miller, 1982), the ability to select occupations congruent to one's interests (Holland, Gottfredson, & Nafziger, 1975), the ability to list more jobs

as future possibilities, consult more people for career information, and confidence and optimism (Taylor, Kelso, & Power, 1986). Some evidence, however, has been found that differentiation and consistency are not related to self- or occupational knowledge (Holland, Gottfredson, & Nafziger, 1975). These studies, however, have not been placed in a causal framework; therefore, causality should not be inferred from correlational findings between the career maturity indicators and interest pattern variables. However, it makes intuitive sense that career maturity is a precursor to the development of clearly defined and well-integrated interests, although this is yet untested. In fact, it could be argued that well-defined interests motivate career exploration and the acquisition of career knowledge. Nevertheless, too few studies have been conducted to draw any definitive conclusions about the relation between career maturity and interest pattern structure.

Gender Differences in the Relation Between Consistency and Differentiation and Vocational Outcomes

Gender differences often have been found in the relation between consistency and differentiation and various vocational outcomes, such as stability of vocational choice (Holland, 1968), satisfaction with vocational choice (Peiser & Meir, 1978), and academic achievement (Reuterfors, Schneider, & Overton, 1979). In general, these studies have found that the interest constructs were related to these vocational outcomes in hypothesized ways for men but not for women. Currently, there is no theoretical basis for these differences and no attempts have been made to explain these results. However, it seems reasonable to investigate possible gender differences in future studies of interest pattern structure.

In an early study, Holland (1968) investigated the relation of consistency and differentiation to stability of vocational choice in a large sample of college freshmen. Consistency and differentiation scores were obtained from results on the Vocational Preference Inventory (VPI) (Sixth Revision; Holland, 1965). Students were classified as consistent or inconsistent based on their two highest VPI scores on the Realistic, Intellectual, Social, Conventional, Enterprising, and Artistic scales. Their differentiation scores were trichotomized into high, middle, or low based on the difference between the highest and lowest VPI score. Stability of vocational choice was classified as "no change" or giving identical occupational choice responses over an eight-month period, "intraclass change," or giving two occupational choices that belong to the same occupational class, and "interclass change," or giving responses that belong to different occupational groups (Holland, 1968, p. 27). Consistency was found to be unrelated to stability of occupational choice, while differentiation was positively related to stability for men but not for women.

Satisfaction with vocational choice or occupation is another outcome that has been frequently researched in consistency/differentiation studies. Peiser and Meir (1978) investigated the effect of consistency and differentiation on vocational choice satisfaction using a sample of 360 high school students. They used the Ramak Interest Inventory (Meir, 1975), based on Roe's (1956) classification of interests, to assess interests during the students' graduation year. Consistency was defined by the distance between the two highest occupational fields on the Ramak at the first administration, the distance being based on a circular arrangement of fields (Meir, 1973).

Differentiation was calculated as the difference between the highest and lowest of the eight occupational field scores. Also, for another measure of differentiation, the scores were first converted to a percentage of all the field scores and then the difference was taken between the highest and lowest scores. Vocational choice satisfaction was measured by one question seven years after the students' graduation. Consistency and differentiation (using the percentage measure) were found to be positively related to satisfaction, but only for males who were working in an occupation that was congruent with their measured interests (congruence existed if a subject was working or studying in an occupational field in which he or she had scored the highest on the Ramak at the first administration). Peiser and Meir (1978) concluded that congruence contributed more to satisfaction than did consistency and differentiation.

Reuterfors, Schneider, and Overton (1979) used the Strong-Campbell Interest Inventory (Campbell, 1974a) to test the effects of consistency and differentiation on academic achievement (assessed by GPA after the first semester of study) among 392 male and 424 female college freshmen. The students were classified as having high consistency if their two highest General Occupational Theme scores were adjacent on Holland's hexagon; moderate if their primary and secondary codes were separated by one intervening position; and low if their two highest codes were opposite on the hexagon. Students were grouped into high and low differentiation groups based on a median split determined from the difference in the lowest and highest General Occupational Theme scores. Reuterfors, Schneider, and Overton (1979) found that the high and low consistency groups had higher

GPAs than the moderate group. They conjectured that the low-consistency students may be multitalented and therefore academically gifted. Differentiation was positively related to GPA for males but not for females.

Importance of Score Elevation

For studies that have failed to find relations between differentiation and vocational outcomes as Holland hypothesized, it has been suggested that this lack of findings is due to the fact that profile elevation has not been taken into account (Swanson & Hansen, 1986). That is, undifferentiated subjects with highly elevated scores have been treated the same as undifferentiated subjects with low elevated scores (Swanson & Hansen, 1986).

Swanson and Hansen (1986) tested 615 liberal arts students with the Strong-Campbell Interest Inventory (Campbell & Hansen, 1981) and identified a group of "undifferentiated" students based on the difference between the lowest and highest General Occupational Theme scores (i.e., those that fell in the low quartile of the distribution of differentiation scores). Consistency of each student's profile was determined by the proximity on Holland's hexagon of the two highest General Occupational Theme codes. For a measure of score elevation, only the students' highest General Occupational Theme standard score was considered; those that fell in the low quartile of the distribution of scores were considered low-elevated. Measures of academic achievement, persistence, and academic comfort also were available for each student. Results indicated that high-elevated, undifferentiated students had higher consistency scores than low-elevated, undifferentiated students; had a higher mean cumulative grade point average; were more likely to be enrolled in college 3 1/2 years after their freshman year; and had a higher mean

Academic Comfort score. Swanson and Hansen (1986) concluded that undifferentiated subjects should not be treated as a unitary group in future studies of the effects of differentiation on vocational outcomes; profile elevation must be accounted for.

Erwin (1987) attempted to account for score elevation in a study of freshman students, using the ACT Interest Inventory. Differentiation was defined as the difference between the highest and lowest scores from the six types assessed by the inventory; profile elevation was based on a median split of their highest interest type score. Erwin (1987) did not find profile elevation to be related to the outcomes investigated in this study. However, he did note that a different measure of elevation was used in this study from Swanson and Hansen's, as well as a different inventory of interests. It is important to note, also, that a limitation of both Swanson and Hansen's (1986) and Erwin's (1987) studies is that only one score from the interest profile was used to measure profile elevation.

While only two studies (Erwin, 1987; Swanson & Hansen, 1986) were found that addressed the issue of profile elevation, it seems reasonable to assert that score elevation is a diagnostic sign from an interest inventory profile that should be considered by counselors in the interpretation process. How is score elevation, or liking many occupations, activities, school subjects, and types of people associated with the interest areas, related to indicators of career maturity?

Summary

This chapter has provided literature that supports the examination of differentiation, consistency, and score elevation as vocational interest

diagnostic signs in this study, and has described the limitations of the previously-developed measures of these constructs. More specifically, a limited amount of information from an interest inventory profile has been considered in the measures of differentiation and score elevation. The traditional measure of consistency has not accounted for the actual correlations between the six interest areas.

A relation between career maturity and the interest diagnostic signs has been hypothesized, and the few studies that directly addressed this hypothesis have been reviewed. These studies indicate that (a) exploratory behavior, (b) indicators of decision-making ability such as the ability to select occupations congruent with one's interests and the ability to list more jobs as future possibilities, (c) the willingness to seek career information from many sources, and (d) confidence and optimism may be related to interest diagnostic signs. Some evidence, however, has been found that interest differentiation and consistency may not be related to self- or occupational knowledge.

Research has been reviewed which found gender differences in the relation between interest differentiation and consistency and various vocational outcomes. In general, these constructs have been found to be positively related to vocational outcomes for males but not for females. These findings suggest that gender differences in the relation between interest diagnostic signs and career maturity should be examined.

Chapter 3 describes the sample and instruments used in this study, presents a rationale for the measures of consistency, differentiation, and score elevation developed for this study, and describes the data analytic procedures

employed. The results of a pilot study conducted in the Spring of 1990 are also presented.

CHAPTER III

METHODOLOGY

Purpose of the Study and its Contribution

The purpose of this study was to investigate, through multiple regression analyses, whether vocational interest differentiation, consistency, and score elevation could be predicted using indicators of various aspects of career maturity. Career maturity indicators used in this study include career planning and exploration attitudes, knowledge of career development principles, knowledge of what it takes to obtain and succeed at a job, and knowledge of one's currently preferred occupation. Little is known about how career maturity is related to interest pattern structure, and previous studies have used measures of differentiation, consistency, and score elevation that take into account a limited amount of information from an interest inventory profile.

The measures of consistency and differentiation used in this study were based on the four highest scores from the profile, which makes use of more information from the profile than has been considered using previous measures[1]. The measure of consistency used here has the added advantage of considering the actual correlations between the interest areas. The measure of differentiation used in this study is conceptually in accord with Holland's assertion that the personality can be described by the degree of resemblance to one, two, or three interest types. This conceptualization is reflected in the

pervasiveness of the Holland three-letter code to classify personalities and occupational environments.

The measure of score elevation developed for this study is unique in that it is consistent with the differentiation measure and has the potential of using the three highest scores from an individual's interest profile (the three-letter Holland code). This measure includes more information from the profile than has been the case with previous measures.

In addition, the interest scores used in this study were first standardized on same-sex norms, which rendered them more useful for the analyses (Campbell & Hansen, 1981; Prediger & Lamb, 1981; Wigington, 1983). Since males and females have different distributions of scores on the Career Development Inventory (CDI) scales, these also were re-standardized on same-sex norms. Another contribution of this study was to explore whether male and female students exhibit different relationships between career maturity indicators and interest diagnostic signs.

Subjects

The sample consisted of 252 undergraduate students, 101 males and 151 females, attending the University of North Carolina at Greensboro, a medium-sized state-supported university, during the 1988-89, 1989-90, and 1990-91 academic years. These students were enrolled in a one-semester elective undergraduate course entitled "Career/Life Planning." The age of these students ranged from 17 to 28, with a mean of 20.5 (mean for males was 21.1; for females, 20.1). The largest percentage of students was classified as seniors (41%). Approximately 17% of the students were freshmen, 23% were sophomores, and 18% were juniors.

As part of the requirements of "Career/Life Planning," these students were administered a battery of career inventories at the beginning of the course. On one of these inventories, the CDI, 25% of the males indicated an occupational group preference for "Business: Sales/Promotion," 21% indicated a preference for "Business: Management," and 11% indicated "Social Science: Teaching/Social Service" as the occupation they were currently considering. Among the females, 25% were considering "Social Service: Teaching/Social Service"; 16% indicated ""Business: Sales/Promotion" as their preferred occupation; and 12% were considering "Business: Management." Interpretations of the results of each inventory were provided to the undergraduate students by supervised master's-level counselor education students.

Instruments

The battery of inventories consisted of a Demographic Data Sheet (see Appendix A), the Myers-Briggs Type Indicator (Briggs & Myers, 1977), the Strong Interest Inventory (SII) (Campbell & Hansen, 1981), the Career Development Inventory (CDI) (Super, Thompson, Lindeman, Jordaan, & Myers, 1981), the Values Scale (Super & Nevill, 1985), the Salience Inventory (Super & Nevill, 1985), and the Adult Career Concerns Inventory (Super, Thompson, & Lindeman, 1985). Only the SII and the CDI were used in this study. Informed consent to use the data for research purposes was obtained from each student (see Appendix B).

The SII yields standardized General Occupational Theme (GOT) scores on the six Holland (1973; 1985) interest areas. Twenty items on the inventory load on each of the six theme scales, and the same items are used for scoring

male and female profiles. "Like" responses to each item are weighted +1, "indifferent" responses are weighted 0, and "dislike" responses are weighted -1; therefore, high positive raw scores on the themes can only be obtained if the respondent answers "like" to many items. Raw scores were standardized on a sample of 600 people, half males and half females. This norm group included workers in professional, vocational/technical, and nonprofessional occupations; the mean age of the norm group was 38.2 years (Hansen & Campbell, 1985).

Because men and women have different distributions on these six GOT scales, the GOT standard scores were transformed to a standard score based on the subject's same-sex norm group. First, the subject's reported GOT score on each of the six Holland areas was converted to a standard score with a mean of zero and a standard deviation of one [2](z=(GOT score - 50)/10). Next, this score was re-standardized using the scale means and standard deviations for each sex obtained from the SII norm group ($z(SD) + M$) (see Table 1). This transformed score is believed to be a more useful score for each subject (Campbell & Hansen, 1981) because (a) it has been found to indicate lower consistency for females, which is in line with research that has found the Holland scheme less suited to females than males (Rounds, Davison, & Dawis, 1979; Wigington, 1983), (b) systematic differences in the codes of females and males in the same occupations are smaller when using standard scores based on same-sex norms (Prediger & Hanson, 1976), and (c) this transformed score is considered more valid for vocational counseling (Prediger & Lamb, 1981).

Insert Table 1 about here

The SII has exhibited excellent test-retest and internal consistency reliabilities (Swanson & Hansen, 1986). A two-week test-retest study of the GOT scores, conducted on a sample of 180 people that consisted mostly of high school seniors and college students, yielded correlations that ranged from .85 to .93, with a median of .91. A thirty-day-interval study on a diverse sample of 102 people including an Army Reserve unit, college students, and women in a career development course, produced test-retest correlations that ranged from .84 to .91, with a median correlation of .86. In addition, a three-year test-retest study of 140 full-time employees in occupations ranging from semi-skilled to professional found correlations that ranged from .79 to .87, with a median of .81 for the GOT scores (Hansen & Campbell, 1985). In a twelve-year-interval study of 409 subjects who had been administered the SII as freshmen at a large midwestern university, the GOT and Basic Interest Scales had a median correlation of .63 for males and females; median correlations were higher for four-year and eight-year intervals (Swanson & Hansen, 1988). Coefficient alpha, internal consistency reliabilities for the six GOT scores, using a sample of 1,445 males, ranged from .90 to .95; for a sample of 1,410 females, the alphas ranged from .90 to .93 (Hansen & Campbell, 1985).

Table 1

Means and Standard Deviations for the Strong Interest Inventory (SII) General Occupational Theme Scales by Sex[1]

SII Scales	Males (n=300)		Females (n=300)	
	$\bar{X}$	SD	$\bar{X}$	SD
Realistic	53.5	9.6	46.5	9.1
Investigative	51.1	9.6	48.9	10.3
Artistic	47.4	10.1	52.6	9.2
Social	49.9	9.8	50.1	10.2
Enterprising	50.8	10.5	49.2	9.4
Conventional	50.4	9.5	49.6	10.4

[1]Adapted from Hansen and Campbell (1985, p. 30).

The construct validity of the GOT scores has been supported through correlations with the Vocational Preference Inventory, which yields scores on the same six Holland interest areas. Correlations between the same-named scales are high, ranging from .72 to .79, with the median being .765 (Hansen & Campbell, 1985).

The Career Development Inventory (CDI), College and University Form (Super, Thompson, Lindeman, Jordaan, & Myers, 1981), is designed to measure several attitudinal and cognitive components of career maturity and yields standard scores on eight scales: Career Exploration (CE), Career Planning (CP), Career Development Attitudes (CDA; a combination of the Exploration and Planning scale scores), Career Decision-Making (DM), World of Work Information (WW), Career Development Knowledge and Skills (CDK; a combination of Decision-Making and World of Work scores), Knowledge of Preferred Occupational Group (PO), and Career Orientation Total (COT; a combination of the Planning, Exploration, Decision-Making, and World of Work Information scales). The instrument is composed of 120 items; it was normed on a group of 1,400 undergraduate college and university students. However, " . . . the sample is not a representative national sample of such students. The sample, does, however, comprise groups that differ in relevant characteristics, including region, size of institution, and major field as well as year and sex" (Thompson & Lindeman, 1982, p. 8).

The CP scale is made up of items in which "the student reports the career planning in which he or she has engaged and the degree of engagement, for example: talking about career plans with an adult friend,

getting a part-time or summer job that will help in deciding what kind of occupation to choose, and getting a job after finishing education or training" (Thompson & Lindeman, 1981, p. 2). The CE scale asks the students to rate various resources, such as relatives, friends, counselors, and the media, as sources of career information and then to indicate how informative these resources have been. Both the CP and CE scales are considered attitudinal in nature: the CP scale is a measure of planfulness and the CE scale is a measure of the quality of exploratory attitudes (Thompson & Lindeman, 1981). These two scales are highly intercorrelated (Thompson & Lindeman, 1981). The CDA scale is a composite scale of the CP and CE scores.

The DM scale is composed of vignettes of people making career decisions, in which the respondent is required to apply principles of career decision-making. "The scale measures the ability to apply knowledge and insight to career planning and decision making" (Thompson & Lindeman, 1981, p. 2). However, it has been suggested that scores on this scale may not correlate highly with the ability to make appropriate career choices for oneself (Westbrook, Sanford, & Donnelly, 1990); therefore, this scale is viewed as a measure of knowledge of career development principles in this study.

The WW scale assesses "knowledge of the career development tasks in the Exploratory and the early Establishment stages" (Thompson & Lindeman, 1981, p. 2). Some additional items on the WW scale require knowledge of the occupational structure and techniques for obtaining and holding on to a job. Thus, the DM and WW scales are highly intercorrelated cognitive scales that assess knowledge of career development principles (DM) and career awareness and occupational knowledge (WW). The CDK scale is a

combination of the scores on the DM and WW scales. An aggregate score across the four scales of CP, CE, DM, and WW, COT represents a "composite measure of four important aspects of career maturity" (Thompson & Lindeman, 1981, p. 3).

Before the CDI is completed, students are requested to choose a preferred occupational group in which they are currently interested. They answer the questions on the PO scale with that occupational group in mind. The scoring for the PO scale, therefore, differs for each occupational group. "Thorough coverage is given to job characteristics, psychological requirements, education, and training; duties are covered only in broad categories (data, people, and things); and the least coverage is given to techniques for getting jobs, employment prospects, and places and hours of work" (Thompson & Lindeman, 1981, p. 2). The PO scale measures knowledge of these job characteristics, requirements, and duties of the preferred occupational group.

Because males and females have different distributions of scores on the CDI scales, the CDI scale scores were re-standardized to be based on same-sex norms. First, these scores were standardized with a mean of zero and a standard deviation of one [3](z=(CDI scale score - 100)/20). Next, these scores were converted using the scale means and standard deviations for each sex obtained from the CDI norm group ($z(SD)+M$) (see Table 2).

Insert Table 2 about here

Table 2

Career Development Inventory (CDI) Standard Score Means and Standard Deviations by Sex[1]

CDI Scales	Males (n=507)		Females (n=682)	
	$\bar{X}$	SD	$\bar{X}$	SD
Career Planning (CP)	102.28	20.02	100.33	19.22
Career Exploration (CE)	100.26	20.25	100.29	19.39
Decision Making (DM)	98.72	20.51	104.29	16.52
World of Work Information (WW)	99.06	21.06	105.04	14.41
Knowledge of Preferred Occupation (PO)	102.40	21.16	101.16	18.26
Combined Attitudinal Scale (CDA)	101.49	20.14	100.35	19.39
Combined Knowledge Scale (CDK)	98.22	21.03	104.87	15.22
Career Orientation -Total (COT)	99.60	20.89	103.52	17.09

[1]These combined means and standard deviations were calculated from scale statistics by year and sex presented in Thompson and Lindeman (1982, p. 18).

Two-week test-retest reliabilities (Thompson & Lindeman, 1984), using a sample of 111 freshmen at a large state university, ranged from .43 for the WW scale to .89 for the CP scale. The correlations for the cognitive scales were lower than for the attitudinal scales: .43 for WW and .65 for DM. Correlations for CDA were .88, for CDK, .57, and for COT, .72. Using the norming sample of undergraduate students, internal consistency reliabilities (Cronbach's alpha coefficients) for the CDA, CDK, and COT scales ranged from .75 to .90. Alphas for the CP, CE, and WW scales were .91, .80, and .67 respectively, with the alphas for the DM and PO scales being lower (.62 and .61, respectively) (Thompson & Lindeman, 1982). Nevertheless, all the CDI scales have adequate reliabilities for use in analyzing group differences (Thompson & Lindeman, 1982).

The content validity of the CDI has been established by experts who agreed that the inventory items represent four of the five dimensions of career maturity originally postulated by the theoretical model generated by the Career Pattern Study (Jordaan & Heyde, 1979; Super & Overstreet, 1960). These dimensions are planfulness, exploration, decision making, information, and reality orientation; however, the CDI does not attempt to assess the reality orientation component of career maturity.

The construct validity of the CDI has been supported by analyses of subgroup differences and factor analyses. For example, based on a sample of 5,039 high school students, the means on all the CDI scales increased from Grade 9 to Grade 11; but for the DM, WW, PO, and CDK scales, the 11th-Grade mean was slightly higher than the 12th-Grade mean. However, as expected, career maturity increased through high school (Thompson & Lindeman,

1981). It was also found that the means on the CDI scales (with the exception of the CE scale) increased from the freshman to senior year in college (Thompson & Lindeman, 1982). This finding is consistent with the expectation that career exploration scores should be higher for freshmen, with upperclass students becoming more crystallized in their career and educational plans and less concerned with exploratory activities.

Since Super's theory of career development predicts minimal sex differences, it was expected that there would be few sex differences in CDI scores, and indeed this has been found to be the case (Thompson & Lindeman, 1981). However, females scored higher on the DM, WW, and CDK scales in the 11th and 12th grades as well as throughout the college years; this is consistent with females' higher scores on such cognitive measures as academic achievement scores. Differences among high school students enrolled in different programs were also investigated. For example, students in honors programs scored higher on the cognitive scales, as would be expected (Thompson & Lindeman, 1981).

Further evidence of the construct validity of the CDI is provided by factor analyses of the scales by class level and sex, for both the School and College Forms (Thompson & Lindeman, 1981, 1982). Consistently, the CP and CE scales load on one factor; the DM, WW, and PO scales load on another, resulting in the expected two-factor structure for each sex within each grade (Thompson & Lindeman, 1981, 1982).

Measures

Differentiation. In accord with Holland's conceptualization, differentiation was conceptualized in this study as a measure of an

individual's resemblance to one or a few of the interest types, as opposed to all the others. This conceptualization is broader than considering only resemblance to a single type and is in accord with Holland's recognition that personality can be defined by more than one type. The widespread professional acceptance of the Holland three-letter code as descriptive of the personality supports this conceptualization.

In this study, differentiation was defined as the maximum of three values: (1) the difference between the highest and second-highest scores (i.e., resemblance to a single type), (2) the difference between the third-highest score and the average of the highest two scores (i.e., resemblance to two types), and (3) the difference between the fourth-highest score and the average of the highest three scores (i.e., resemblance to three types). Thus, differentiation is the degree to which an individual's measured interests resemble one, two, or three of the Holland types.

This method of defining differentiation has the advantage of using information provided in the four highest scores of the interest profile, which is an improvement over measures proposed by Holland (1973), Spokane and Walsh (1978), Monahan (1987), and Iachan (1984). Gati's (1985) measure of "interest crystallization" also can use four scores, but this method has the additional problems referred to in Chapter 2. However, the measure proposed here can be criticized for using a rigid determination of which scores are salient (Gati, 1987) and is potentially problematic since it assigns the same differentiation score to profiles that resemble one, two, or three types. For example, these RIASEC profiles would receive the same differentiation score: (a) 80,20,20,20,20,20 (b) 80,80,20,20,20,20 and (c) 80,80,80,20,20,20. The

mathematically-sophisticated measures developed by Iachan (1984) suffer from this same problem and use only three scores from the interest profile.

Consistency. The measure of consistency used in this study was based on actual correlations between the six interest areas obtained from the norm group upon which the SII was standardized. These correlations, reported separately for males and females, were first converted to Fisher's Zs (see Table 3), because these can be treated as interval-level measures, as required by multiple regression analyses, whereas correlations cannot. The Fisher's Z statistic is defined as one-half the natural logarithm of $(1 + |r| / 1 - |r|)$, where r is the Pearson correlation coefficient (Glass & Hopkins, 1984, p. 305). This statistic has an approximately normal sampling distribution that is not dependent on the value of the population correlation (ρ); thus, Fisher's Zs can be treated like standard scores.

Insert Table 3 about here

The Holland three-letter code was ascertained for each student; and the Fisher's Zs associated with all of the possible two-letter combinations of that code were averaged. If the fourth-highest interest score was tied with the third-highest, the procedure was as follows: (1) the fourth-highest score was substituted for the third-highest score, (2) Fisher's Zs associated with all the possible two-letter combinations of that code were averaged, and (3) the mean of that average with the original average was calculated. This procedure was necessary in only one case.

Table 3

Pearson Correlation Coefficients[1] and Fisher's Zs (in Parentheses) between the Strong Interest Inventory (SII) General Occupational Theme Scores

(Correlations above the diagonal based on 300 women; those below the diagonal based on 300 men)

SII Scale	Realistic	Investigative	Artistic	Social	Enterprising	Conventional
Realistic	–	.62 (.725)	.25 (.255)	.25 (.255)	.19 (.192)	.32 (.332)
Investigative	.59 (.678)	–	.40 (.424)	.25 (.255)	.10 (.100)	.25 (.255)
Artistic	.15 (.151)	.38 (.400)	–	.19 (.192)	.13 (.131)	-.11 (-.110)
Social	.33 (.343)	.33 (.343)	.26 (.266)	–	.37 (.388)	.41 (.436)
Enterprising	.37 (.388)	.15 (.151)	.10 (.100)	.42 (.448)	–	.47 (.510)
Conventional	.41 (.436)	.41 (.436)	.08 (.080)	.37 (.388)	.51 (.563)	–

[1]Adapted from Hansen and Campbell (1985, p. 29).

This measure of consistency has the advantage of using at least three (and possibly four, in the event of ties) of the highest interest scores in the profile and is based on actual correlations between the types and not simple positioning on Holland's hexagon. Using the hexagonal position as a measure of consistency is flawed in many cases, because some pairs of types that have an intervening position on the hexagon have higher correlations than some adjacent pairs. For example, using the GOT standard scores from the group of 600 people upon which the SII was normed, the correlation between the adjacent types of Artistic and Social is .22, while the correlation between Conventional and Social types (with one intervening position) is .39.

Score Elevation. The measure of score elevation was designed to be consistent with each student's measure of differentiation. If a student's maximum differentiation measure corresponded to resemblance to a single type (subtracting the second-highest score from the highest score), then elevation was measured by the highest interest score. If the maximum differentiation measure corresponded to resemblance to two types (subtracting the third-highest score from the average of the two highest scores), then the score elevation measure was the average of the two highest scores. If the maximum differentiation measure corresponded to resemblance to three types (subtracting the fourth-highest score from the average of the three highest scores), the measure of score elevation was the average of the three highest scores. Again, this method has the potential of using more information provided in the profile of scores than has been

considered in previous measures of this variable (Erwin, 1987; Swanson & Hansen, 1986).

Data Analyses

First, the six GOT standard scores and CDI scale scores for each individual were transformed using same-sex norms. Next, the correlations between the six GOT standard scores for males and females reported in Hansen and Campbell (1985) were converted to Fisher's *Z*s (see Table 3). Then, measures of consistency, differentiation, and score elevation were computed for each student, as described in the Measures section above.

Using the SAS statistical package for data analysis, multiple regression analyses were conducted with the interest pattern variables of differentiation, consistency, and score elevation as dependent variables and the attitudinal and cognitive variables from the CDI as predictor variables (CP, CE, DM, WW, and PO scales). A "dummy"-coded gender variable (0 for males; 1 for females) and all possible gender-CDI variable interactions also were included as predictors in order to test for gender differences in corresponding regression coefficients and means.

To examine the possibility of gender differences in the prediction of each interest measure, the statistical significance of the incremental proportion of variance accounted for by all gender-CDI variable interaction terms, controlling for variance explained by career maturity predictors and gender terms, was tested using a Type I error level (α) of .05. An *F*-test was conducted to address this question, with a non-significant *F* indicating that the corresponding regression coefficients associated with the CDI predictor variables are the same for males and females. Gender differences in means

on each interest measure were examined by testing the statistical significance of the regression coefficient associated with the "dummy"-coded (0,1) gender variable at the .05 level.

To examine the ability of the predictor variables together to account for a significant proportion of the variance in each dependent measure, the statistical significance of the coefficient of determination (R^2) was tested using a Type I error level (α) of .05. An *F*-test was conducted to address this question for each dependent variable.

To examine the significance of the predictive contribution of each of the independent variables in each regression equation, the statistical significance of each variable's coefficient was tested using a Type I error level (α) of .05. In other words, when the other independent variables were controlled, was the coefficient of each predictor variable significantly different from zero? Student's t-tests were conducted to address these questions.

The use of regression analysis presumes that the predictor variables (the CDI scales) are precursors of the dependent variables (the interest diagnostic signs). From a theoretical perspective, Super (1990) views planful and exploratory attitudes as well as career and work world information as prerequisites to the development of clearly-defined interests. For example, how can one know what he or she is interested in without having first explored and acquired knowledge about careers? How can career counselors put much faith in interest inventory results without assessing how much exploratory activity and work experience the client has engaged in?

Furthermore, social learning theory, upon which both Super's and Holland's perspectives are based, suggests that interests are learned from

experience with the environment. However, modern social learning theory also recognizes the reciprocal nature of the person-environment interaction (Miller, 1983), suggesting the possibility that as interests become more solidified, motivation for career planning should increase, exploratory behaviors should become more important, and career information-gathering should become critical. While the transactional nature of these relationships is recognized, from an applied perspective, it is much easier to see how career counselors could directly affect a client's level of career maturity rather than his or her clarification of vocational interests. In practice, career counselors encourage clients to engage in behaviors that stimulate the development of career maturity. Thus, the career maturity variables are viewed as more amenable to influence by counselors' efforts, and are therefore conceptualized as the predictor variables in the regression analyses.

The attitudinal variables, CP and CE, from the CDI were expected to be highly intercorrelated. The same is true of the cognitive variables, DM and WW; thus, the possibility of multicollinearity was examined. Highly correlated independent variables in regression analysis can lead to imprecise estimates of regression coefficients and the sum of squares attributable to each variable. This situation can result in a significant amount of variance explained by an overall model, although none of the standardized regression coefficients are significantly different from zero (Norusis, 1988).

To examine this problem, the correlation coefficients between the predictor variables were examined for the total sample. "Large coefficients in the correlation matrix always signal the presence of multicollinearity" (Norusis, 1988, p. 55). However, the "tolerance" of each variable, the

proportion of variance in that variable not accounted for by the other variables in the model, also was examined. Small tolerances indicate multicollinearity. In the event that multicollinearity was a problem, the combined attitudinal and cognitive scales from the CDI would be used as predictors in the regression analyses.

Tests of the assumptions of multiple regression analysis were also conducted. The assumptions of linearity and homoscedasticity were examined by reviewing scatterplots of studentized residuals and predicted scores. If the regression is linear, the means of the residuals (differences between actual and predicted scores) should fall on a straight line of zero slope and zero intercept. If homoscedasticity is present, the conditional variances of the residuals should be similar. The assumption of normality of the distribution of residuals was examined by reviewing a histogram of the studentized residuals and conducting a Shapiro-Wilk's test of normality on each dependent variable.

Pilot Study

In the spring of 1990, a preliminary analysis of the relationships among differentiation and score elevation and scores on the CDI scales was conducted on a sample of 125 undergraduate students who were enrolled in the Career/Life Planning course during the 1988-89 and 1989-90 academic years. At the beginning of each semester, as part of the course requirements, these students had completed the battery of career inventories which included the SII and the CDI.

The primary purposes of the study were (a) to determine which aspects of career maturity, as measured by the CDI, were related to interest

differentiation and score elevation, as measured by the SII, and (b) to determine if there was a significant interaction effect between differentiation and score elevation on CDI scores. For the analyses of variance that were conducted, the interest variables of differentiation and score elevation were conceptualized as classification variables with the CDI scales as dependent variables. The effects of consistency and gender on the CDI scales were not investigated in this study.

Students' interest profiles were classified as "undifferentiated," "moderately differentiated," or "highly differentiated" based on the standard deviation of their six GOT scores obtained from the SII (for this study, the actual GOT standard scores were used, which are standardized on combined-sex norms). Students' interest profiles were classified as "low elevated," "moderately elevated," or "highly elevated" based on the mean of their six GOT scores. Simple analyses of variance were conducted on the CDI scales to test for significant main and interaction effects of differentiation and score elevation, followed by Scheffé's test for post-hoc comparisons, where appropriate.

Results revealed significant interaction effects for differentiation and score elevation on the DM ($F(4,116)=2.27$, $p<.10$) and the CDK (combination of DM and WW; $F(4,116)=2.04$, $p<.10$) scales of the CDI. The highly-differentiated students were fairly consistent across all levels of score elevation in terms of their DM and CDK scores, and their group mean scores on these scales were fairly high. However, the undifferentiated students did not fit this pattern. The students with low elevation, undifferentiated profiles had relatively low means on these cognitive scales. The

undifferentiated, moderately-elevated students had the lowest mean scores on DM and CDK. However, undifferentiated students with highly-elevated profiles had relatively high scores on these cognitive scales, appearing to score more similarly to the differentiated students than to the rest of the undifferentiated students.

For the WW scale, only a significant main effect for differentiation was found ($F(2,116)=1.41$, $p<.05$); score elevation did not make a difference with respect to World of Work knowledge. Scheffé's test revealed a significant difference between the WW scale means for undifferentiated and highly-differentiated students. The highly differentiated group had the highest mean score on this scale (99.3 compared to 88.9) for the undifferentiated group).

Very different results were obtained for the attitudinal scales of the CDI. Significant score elevation main effects were found for the CP ($F(2,116)=3.41$, $p<.05$), CE ($F(2,116)=4.40$, $p<.05$), and CDA (combination of CP and CE; $F(2,116)=5.24$, $p<.01$) scales. The higher a student's level of elevation on the SII, the higher the student's scores on these three attitudinal scales. Scheffé's tests revealed that the low-elevated students and the highly-elevated students scored significantly differently on CE and the total scale, CDA. On the CE scale, the highly-elevated group had a mean score of 110.3, compared to 97.7 for the low-elevated group. For the CDA scale, the mean score for the highly-elevated group was 105.7, compared to 93.1 for the low-elevated group. On the CP scale, the low-elevated group (M= 90.9) and the moderately-elevated group (M= 99.5) were significantly different. No

significant effects were found for level of differentiation on the SII on any of the attitudinal scales.

In summary, this preliminary study demonstrated that the CDI had potential to be a useful instrument in understanding and interpreting undifferentiated and low-elevated profiles on the SII. Higher score elevation on the SII (i.e., responding "like" to many of the items across all six interest areas) was related to planful and exploratory attitudes as measured by the CDI, while differentiation (i.e., more clearly defined interests) and score elevation on the SII had an interaction effect on knowledge of the world of work and career development principles as measured by the CDI. This study also demonstrated the necessity of considering score elevation in light of differing levels of differentiation with respect to cognitive factors of career maturity.

Limitations of this preliminary investigation were addressed in the present study. Although used by Healy et al. (1984) and Healy and Mourton (1984), measuring differentiation by the standard deviation of the six GOT standard scores was found to be flawed and, therefore, confidence cannot be placed in the results related to differentiation effects. The present study employed a more conceptually and statistically complete measure of differentiation. This study also used a larger sample size, and GOT and CDI scores for each subject were transformed to reflect same-sex norms. In the present study, consistency was examined because (a) it is a readily available diagnostic sign from an interest profile that can be used by a career counselor, (b) inconsistent profiles are problematic for career counseling, and (c) consistency is typically examined in research studies in conjunction with differentiation on vocational outcomes. The relationship between career

maturity and score elevation, another vocational diagnostic sign from a SII profile that has been infrequently investigated, was examined in this study. Finally, gender differences in the relationships between career maturity variables and interest pattern structure were explored.

CHAPTER IV
RESULTS

This chapter contains a description of research findings, as well as a discussion of the degree to which the assumptions of multiple regression analysis have been satisfied by the sample data used in this study.

Findings

The correlation matrix between the Career Development Inventory (CDI) scales was examined to address the possible problem of multicollinearity among predictor variables (see Table 4). Moderate correlations were obtained between the Career Planning (CP) and Career Exploration (CE) scales, the Decision-Making (DM) and Knowledge of Preferred Occupation (PO) scales, and WW and PO scales. However, the correlation between the DM and WW scales was high (.71), therefore, the tolerances of these variables were examined in the regression models. None of the tolerances were found to be small, although the tolerances for DM and WW were smaller than those of the other predictors. However, the standard errors of the regression coefficients were similar for all of the CDI predictor variables. Therefore, it was concluded that multicollinearity was not a problem in the regression models. Thus, the regression models did not require the use of the combined CDI scales.

Insert Table 4 about here

Table 4

Intercorrelations of Career Development Inventory (CDI) Scales (N = 252)

CDI Scales	Career Planning (CP)	Career Exploration (CE)	Decision Making (DM)	World of Work Information (WW)	Knowledge of Preferred Occupation (PO)
Career Planning (CP)	–	.47 **	.12 *	.15 *	.13
Career Exploration (CE)		–	.06	.06	.04
Decision Making (DM)			–	.71**	.29**
World of Work Information (WW)				–	.35 **
Knowledge of Preferred Occupation (PO)					–

* Significant at .05 level

** Significant at .0001 level

For each interest dependent measure, full regression models included the individual CDI predictor variables, a gender variable coded "0" for males and "1" for females, and all of the possible gender by CDI variable interaction terms. Reduced regression models omitted the gender-CDI variable interaction terms. The incremental proportion of variance explained by the interaction terms in any of the interest measures was not statistically significant, indicating that the regression coefficients associated with corresponding career maturity measures for males and females did not differ significantly. This finding made it unnecessary to examine separate regression equations for males and females.

However, in the reduced model for differentiation, the gender term was statistically significant (t=2.08, p=.04), indicating a gender difference in the intercept for differentiation. The coefficient of the gender variable represents the estimated difference in mean differentiation scores between males and females. The estimated difference, 1.68, is a practically insignificant difference, however, since the differentiation measure ranged from 1.62 to 31.57. Females had a higher mean differentiation score than males (mean for females was 11.2; for males, 9.6).

Also, in the reduced model for consistency, the gender term was statistically significant (t=-7.10, p=.0001), indicating a gender difference in the intercept. Again, the coefficient of the gender variable is the estimated difference in mean consistency between males and females. Males had a higher mean consistency score than females (mean for males was .41; for females, .30). This difference is substantial, considering that consistency scores ranged from .16 to .52. For the elevation measure, the gender term was

not significant, indicating no significant gender difference in means on score elevation.

For the differentiation measure, the attitudinal and cognitive aspects of career maturity, as measured by the CDI, did not predict a significant proportion of the variance (see Table 5). None of the individual CDI predictor variables was statistically significant.

Insert Table 5 about here

For the consistency measure, the attitudinal and cognitive aspects of career maturity, as measured by the CDI, together with the gender term, did predict a significant proportion of the variance (see Table 5). Approximately 29% of the variance in consistency was predicted by the CDI and gender variables. Only one significant career maturity predictor emerged from the analysis: Knowledge of One's Preferred Occupation, the PO scale (t=2.1, p=.04). Thus, having more specific knowledge about an occupational area that one is currently considering is associated with having more consistent interests. Although the incremental proportion of variance explained by the CDI predictors, over that associated with gender, was only approximately 5%, this increment was statistically significant ($F(5,204)=2.63$, $p<.05$).

It is interesting to note that although they were not significant predictors of consistency in this regression model, the DM and WW scales had significant, negative correlations with the consistency measure (see Table 6). It is possible that these correlations indicate that students with more

Table 5

Multiple Regression Results Predicting Interest Differentiation and Consistency from Career Maturity (N=211)[1]

	Dependent Measures					
	Differentiation			Consistency		
Predictor Variables	Beta	t	p	Beta	t	p
Career Planning (CP)	.12	1.45	.15	-.07	-.97	.33
Career Exploration (CE)	-.11	-1.39	.17	-.07	-.98	.33
Decision-Making (DM)	.04	.43	.67	-.15	-1.74	.08
World of Work Information (WW)	-.02	-.20	.84	.03	.36	.72
Knowledge of Preferred Occupation (PO)	.03	.39	.70	.13	2.10	.04
Gender	.16	2.08	.04	-.48	-7.10	.0001
Model:						
Degrees of Freedom	(6,204)			(6,204)		
F	1.43			15.08		
p	.20			.0001		
Adjusted R^2	.01			.29		

[1]Only 211 students could be used in the regressions due to missing data on the PO scale.

diverse interests are able to score higher on the DM and WW scales which require a wider range of knowledge of career development principles and the work world.

Insert Tables 6 and 7 about here

A small but statistically significant proportion of the variance in the score elevation measure was predicted by the CDI scales together (see Table 7). Approximately 6% of the variance in score elevation was accounted for by the career maturity variables. Two significant predictors emerged from the analysis: the CE scale (t=2.35, p<.05) and the PO scale (t=2.43, p<.05). Thus, willingness to engage in career exploration and use a variety of sources for career information, as well as knowledge of one's currently preferred occupation, were weakly predictive of higher interest score elevation, or liking many occupations, activities, school subjects, and types of people associated with the interest areas. Correlations with score elevation were .19 (p<.01) for the CE scale and .17 (p<.05) for the PO scale (see Table 6).

To summarize the results, Hypotheses 1, 5, and 9 were supported. No significant differences in the regression coefficients associated with corresponding career maturity variables for males and females were found in the prediction of differentiation, consistency, and elevation of interests. Therefore, it was not necessary to estimate separate regression equations for males and females. Hypotheses 2 and 6 were not supported. There were gender differences in means for the differentiation and consistency measures. Females had a higher mean differentiation score, and males had a higher

Table 6

Intercorrelations of Predictor and Interest Variables (N=252)

Predictor Variables	Interest Variables: Differ.	Consistency	Elevation
Career Planning (CP)	.05	-.05	.19**
Career Exploration (CE)	-.05	-.10	.19**
Decision-Making (DM)	.10	-.31***	.01
World of Work Information (WW)	.11	-.19**	.03
Knowledge of Preferred Occupation (PO)	.05	.06	.17*

* Significant at .05 level.

** Significant at .01 level.

*** Significant at .0001 level.

Table 7

Multiple Regression Results Predicting Interest Score Elevation from Career Maturity (N=211)[1]

	Score Elevation		
Predictor Variables	Beta	t	p
Career Planning (CP)	.08	1.02	.31
Career Exploration (CE)	.18	2.35	.02
Decision-Making (DM)	-.02	-.23	.82
World of Work Information (WW)	-.02	-.22	.83
Knowledge of Preferred Occupation (PO)	.18	2.43	.02
Model:			
Degrees of Freedom	(5,205)		
F	3.55		
p	.004		
Adjusted R^2	.06		

[1]Only 211 students could be used in the regressions due to missing data on the PO scale.

mean consistency score. However, Hypothesis 10 was supported, in that no gender difference was found for the mean elevation score.

Hypotheses 3 and 4 were not supported because the career maturity scales together did not predict interest differentiation scores. Hypothesis 7 was supported because the career maturity variables together predicted a significant (but small) proportion of the variance in interest consistency; however, Hypothesis 8 was only partially supported because only one CDI variable was a weak predictor of consistency, knowledge of one's currently preferred occupation.

Hypothesis 11 was supported because the career maturity variables together predicted elevation scores; however, Hypothesis 12 was only partially supported by the finding that career exploration and knowledge of one's preferred occupation were the only significant predictors of score elevation.

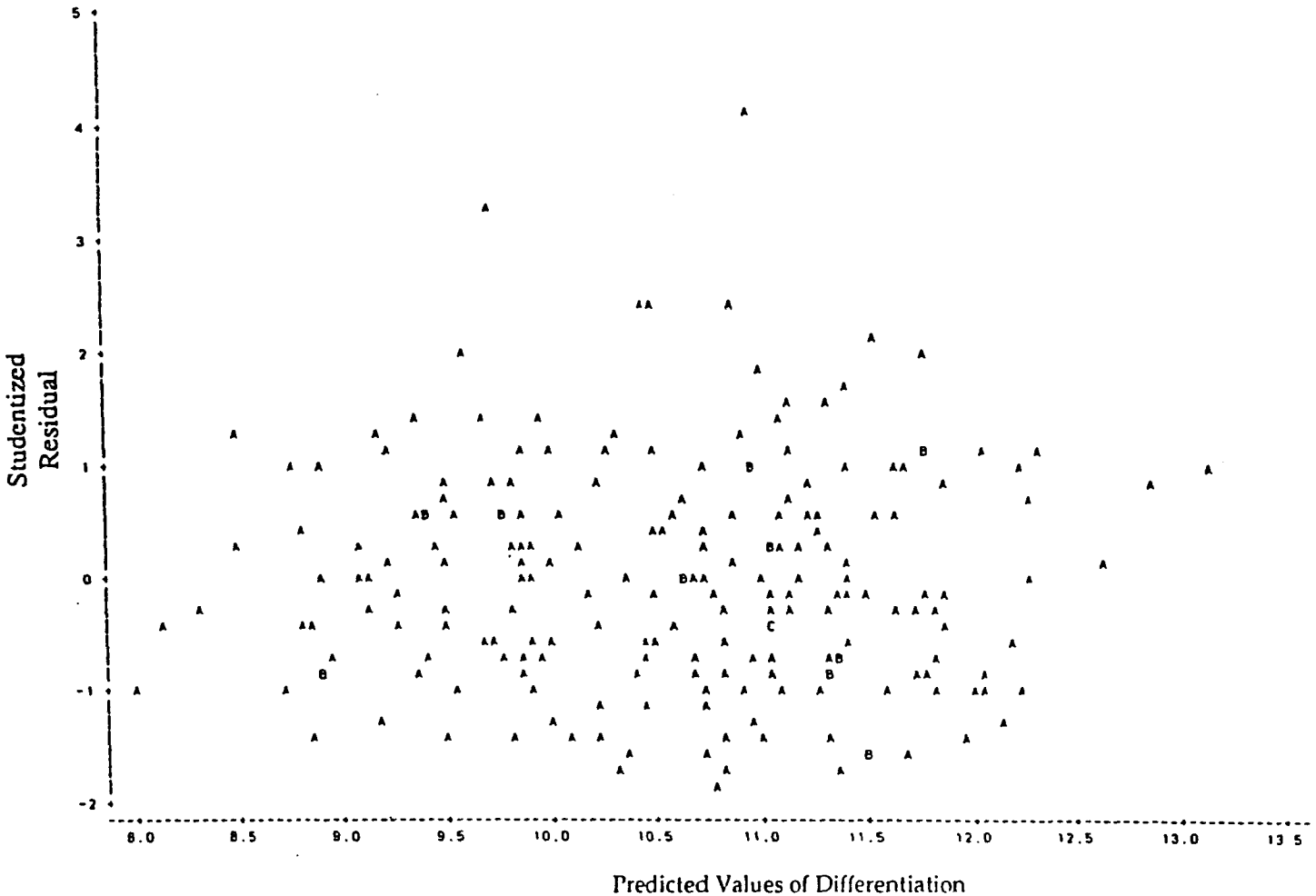
Assumptions of Multiple Regression Analysis

To examine the assumptions of linearity and homoscedasticity, scatterplots of the studentized residuals and predicted scores were reviewed for all regression models. Figures 2a, 2b, and 2c present these scatterplots for the total sample. No evidence of curvilinearity or heteroscedasticity was found in the plots for differentiation, consistency, and elevation.

Insert Figures 2a, 2b, 2c about here

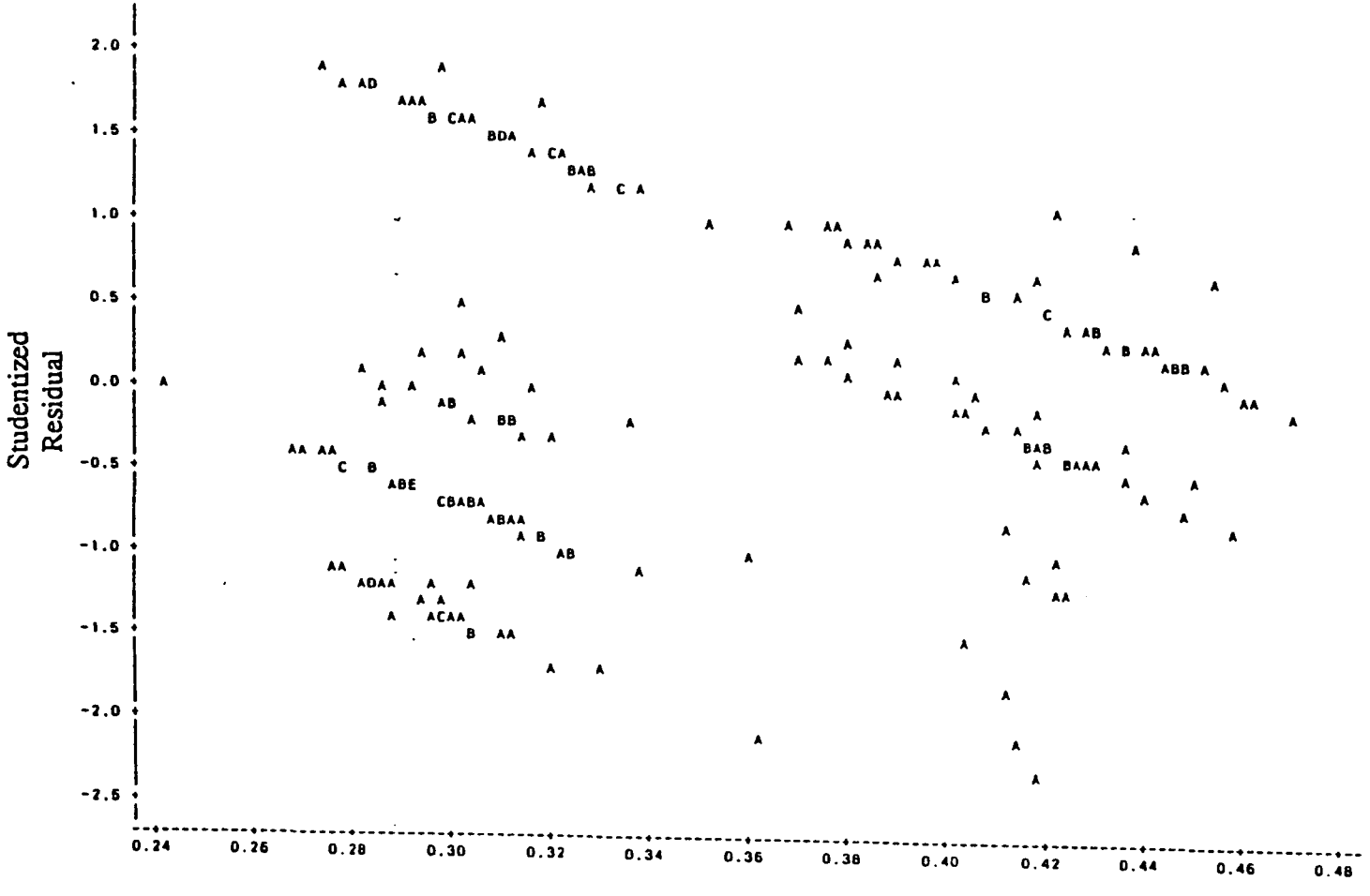
The assumption of normality was examined by reviewing the histograms of studentized residuals from all of the regression analyses

Figure 2a. Plot of studentized residuals by predicted values of differentiation



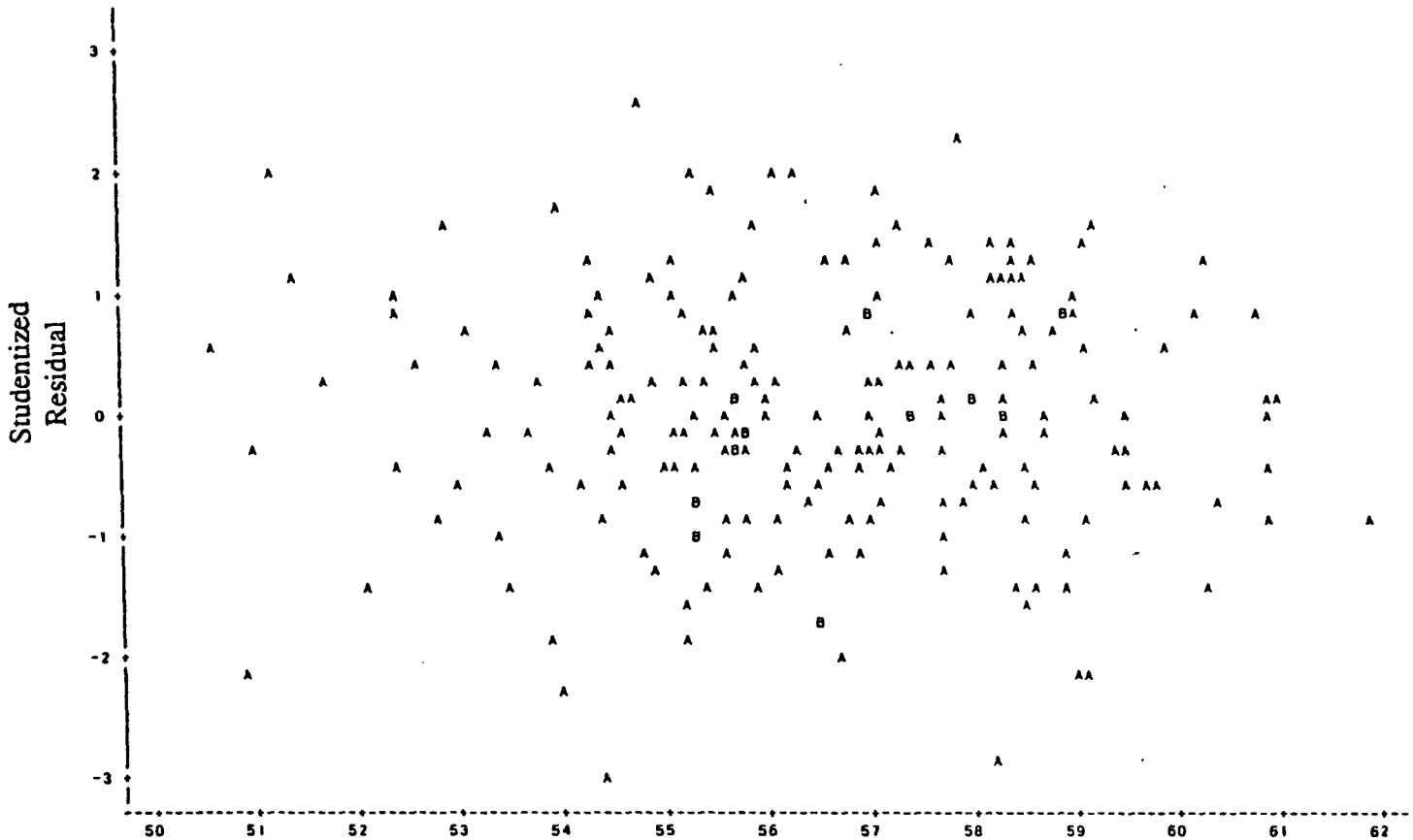
41 obs had missing values

Figure 2b. Plot of studentized residuals by predicted values of consistency



41 obs had missing values

Figure 2c. Plot of studentized residuals by predicted values of elevation



41 obs had missing values

conducted and by applying the Shapiro-Wilk's test. The distributions of residuals from the regressions on differentiation and consistency did not appear to approximate a normal distribution. The differentiation measure was not normally distributed (Shapiro-Wilk's statistic (W) was .97, $p<.001$). The consistency measure also was not normally distributed ($W=.84$, $p<.0001$). "The *W* statistic is the ratio of the best estimator of the variance (based on the square of a linear combination of the order statistics) to the usual corrected sum of squares estimator of the variance" (SAS Institute, Inc., 1990, p. 627).

The differentiation measure was skewed toward lower values, indicating a predominance of students with relatively undifferentiated interests in this sample. The lack of normality in the consistency measure was due to the fact that approximately 61% of the males had some combination of REC, SEC, or RSE for their three-letter Holland code and approximately 65% of the females had codes with some combination of ASE or SEC. This resulted in a predominance of the average of the Fisher's-Z transformations of correlations corresponding to these codes for the consistency measure. However, any linear transformation of the differentiation and consistency measures, e.g., spreading out these variables, would not have resulted in different correlations between the transformed measures and the predictor variables. Thus, transformations were not attempted.

CHAPTER V
DISCUSSION

Implications

For the students in this sample, there was no relationship between the attitudinal and cognitive aspects of career maturity as assessed by the Career Development Inventory (CDI) and interest differentiation as assessed by the Strong Interest Inventory (SII). This finding implies that having positive career planning and exploration attitudes and having knowledge of career development principles, the work world and one's preferred occupational area would not necessarily lead to better clarified vocational interests. Both high and low CDI scores on the attitudinal and cognitive components of career maturity were found among students with clearly-defined interests as well as among those with undifferentiated interests. Again, an increase in differentiation of interests would not be expected to result from counselors' efforts to increase clients' career exploration and planning attitudes or career knowledge. It was found that female students tended to have more highly differentiated or clearly-defined interests than did male students. This finding is consistent with Reuterfors, Schneider, and Overton (1979)'s study, which found a larger percentage of females with differentiated General Occupational Theme scores as well as with Wiggins et al. (1983)'s research which found significantly higher Vocational Preference Inventory (VPI) differentiation scores for females.

Knowledge of one's currently preferred occupational area (PO scale) was slightly predictive of interest consistency for these students. This finding implies that acquiring more knowledge in a specific area may be useful in consolidating one's interests in areas that are similar to one another. Although as yet untested, it could be speculated that as one acquires more specific information about an occupation of at least some interest at the current time, perhaps one becomes aware of incompatibilities in other occupational activities that one is considering and adjusts preferences accordingly, ultimately resulting in a more consistent interest profile. However, even though the slope for the PO variable was statistically significant, it was too small to be of much practical significance. Therefore, it must be concluded that counselors' efforts to help clients increase their knowledge bases of occupations of current interest would be expected to result in only very small increases in interest consistency. Furthermore, it was found that males tended to have more consistent or similar interests than did females. This finding conflicts with the results of the Reuterfors, Schneider, and Overton (1979) study which found a larger percentage of females with high consistency scores. Slaney (1980) found no significant gender differences in VPI consistency scores.

Score elevation among sampled students was weakly predicted by career exploration attitudes and knowledge of one's preferred occupation. This finding implies that being more willing to use a variety of sources of information and finding these sources of information more useful as well as acquiring knowledge of a particular occupational area of interest may lead to higher interest scores among those few interest areas that are most preferred.

As measured in this study, higher score elevation is indicative of a person who likes a lot of things associated with one to three of the interest areas. Willingness to engage in exploratory behavior and considering the information that one has collected to be useful and responding "like" to many occupations, activities, school subjects, and types of people associated with the Holland areas could be reflecting a positive emotional component or optimism about one's career development. Or it could be possible that students who like a lot of things are more motivated to engage in career exploration activities, in an attempt to narrow their occupational interests. Counselors could expect that an increase in concern with exploratory activity would be associated with a very small increase in interest score elevation for students.

Knowledge of one's preferred occupation also was weakly predictive of score elevation among students. If clients are helped by counselors to acquire more specific knowledge of one career area of interest, this could be expected to be associated with a very small increase in interest score elevation. Perhaps learning more about what occupations, activities, subjects, and types of people are encompassed by a broad occupational area assessed by the CDI results in more "liking" responses to various components that comprise the Holland areas assessed by the SII. A significant mean difference in interest elevation scores was not found between male and female students.

Overall, these results imply that career counselors focusing on helping clients increase the various attitudinal and cognitive aspects of career maturity assessed by the CDI would not result in even moderately increased levels of interest differentiation, consistency, or score elevation as assessed by

the SII measures used in this study. Only a very slight increase in interest consistency and score elevation might be expected from attention to the enhancement of career exploration attitudes and career knowledge. No meaningful gender differences in relationships between career maturity and interest pattern structure were found, suggesting that the theoretical notions derived from Holland's and Super's perspectives, which led to hypothesized relationships between career maturity and interest pattern structure, do not operate differentially for males and females.

Limitations

A source of bias in estimates of the coefficients associated with the predictor variables and a downward bias in the estimation of the coefficient of determination is unreliability of the predictor variables (Pedhazur, 1982). In fact, "reliability tends to be problematic for career maturity measures" (Chartrand & Camp, 1991, p. 10). Thompson and Lindeman (1982) reported standard errors of measurement (SE_ms) for the CDI scales from the College and University Form, which reveal larger SE_ms for the cognitive scales, and thus smaller reliabilities, for both males and females.

However, it is apparent that some other variable or variables not investigated in this study account for most of the variance in the interest measures. For example, it has been suggested in other studies that exploratory behavior may be related to differentiation and integration of vocational interests (Miller, 1982). Exploratory behavior is not directly assessed by the CDI; the closest approximation to a behavioral scale would be Items 31 through 40 that compose part of the Career Exploration (CE) scale. These items ask the respondent to indicate how useful various sources of

information have been in the past. Perhaps these items should be analyzed separately for their contribution to the prediction of differentiation, consistency, and score elevation. As the CDI is scored currently, these items are combined with other items that assess how likely the respondent would be to consult various sources for career information. Willingness to consult many sources for career advice and one's actual behavior in seeking information are separate components of career maturity and perhaps should be analyzed separately. Alternatively, in future studies, the Career Exploration Survey (Stumpf et al., 1983) could be used to assess both self- and environmental exploratory activity.

It is also likely that decision-making ability is positively related to interest differentiation and consistency. Holland, Gottfredson, and Nafziger (1975) found that the ability to select occupations congruent with one's interests was related to differentiation and consistency. Although the Decision-Making (DM) scale of the CDI assesses one's knowledge of occupations congruent with specified interests, perhaps it does not measure one's ability to make appropriate career decisions for oneself (Westbrook, Sanford, & Donnelly, 1990).

Factors that motivate career exploration, not addressed in this study, also may be predictive of interest pattern structure. In a sample of 106 college students, Blustein (1989) found that goal-directedness, measured by the Goal Instability Scale (Robbins & Patton, 1985), and self-efficacy beliefs about career decision-making, measured by the Career Decision-Making Self-Efficacy Scale (Taylor & Betz, 1983), were positively associated with self-reported career exploratory activity assessed by the Career Exploration Survey (Stumpf et al.,

1983). Robbins (1987), using a sample of 107 college students enrolled in career/life planning courses, found goal instability to be significantly correlated with interest pattern structure. Blustein and Phillips (1988), using a sample of 148 undergraduates, found that the rational decision-making style and stress related to exploration (measured by the exploratory stress scale from the Career Exploration Survey) were associated with self-reported exploratory activity. It also might be possible that work salience is an important motivator of exploratory behavior.

Barak, Librowsky, and Shiloh (1989) suggested that exploratory experiences are mediated by cognitions of perceived abilities, expected success, and anticipated satisfaction which in turn determine the existence and magnitude of interests. For example, an individual who perceives the ability, likelihood of success, and future satisfaction from many different types of activities as opposed to a few may exhibit a less differentiated and less consistent interest profile. Furthermore, there may be emotional factors such as depression and psychological characteristics such as dominance, self-acceptance, and responsibility (e.g., Murray, 1981) that could account for significant proportions of the variance in interest differentiation, consistency, and score elevation. It also could be possible that measures from the SII, such as extraversion-introversion and academic comfort scores, which could be related to traits such as dominance, are predictive of interest pattern structure. Self-esteem also has been found to be positively related to interest pattern structure (Robbins, 1987).

In addition to these untested variables, another limitation of this study concerns the measures developed for differentiation, consistency, and score

elevation. Although these measures had several advantages over previously used measures, they still were flawed in some respects. The differentiation measure only used four of the available interest scores and assigned equal values to profiles resembling one, two, or three types. For example, these RIASEC profiles would have received the same differentiation score: (a) 80,20,20,20,20,20 (b) 80,80,20,20,20,20 and (c) 80,80,80,20,20,20. However, the mathematically-sophisticated measures developed by Iachan (1984) also have this problem and use only three scores from the interest profile. In the present study, the consistency measure resulted in what was essentially a categorical variable for this sample due to the predominance of certain combinations of Holland three-letter codes. Approximately 61% of the males had some combination of REC, SEC, or RSE for their three-letter code; approximately 65% of the females had codes with some combination of ASE or SEC. The predominance of certain three-letter codes reduced the variability of the consistency measure. The score elevation measure had the potential of using only three of the interest scores in the profile. Measures of these constructs that are conceptually complete, yet utilize more of the information in the profile, need to be developed.

This study also is limited by the questionable generalizability of results to all university students. The University of North Carolina at Greensboro is classified as a "moderately difficult" university in its selectivity; more than 75% of the freshmen were in the top half of their high school graduating class and scored over 900 on the SAT (Dilts, 1992). It is very similar in this respect to UNC-Wilmington, UNC-Asheville, UNC-Charlotte, and North Carolina State University. Parental income indicators suggest that UNCG's students,

on average, are "middle class." Among the dependent students who applied for financial aid in the 1990-91 academic year, the average parental income was $35,880 (Clark, 1992). Since juniors and seniors were overrepresented in this sample, the sample was probably reasonably representative of more advanced undergraduates in similar American universities, and thus the study results may be generalizable to this type of student population.

An additional limitation of this study has to do with the data collection procedures used. Although students were asked to fill out the CDI and the SII in a quiet place by themselves, no controls were introduced to ensure that this was indeed the case.

Although the results of this study were disappointing in the sense that, in this sample of undergraduates, career maturity (as assessed by the CDI) was not strongly related to variables derived from the SII that are widely assumed to be relevant to the interpretation of interest inventories, (i.e., diagnostic signs of differentiation, consistency, and score elevation), this study represents the beginning of research in an unexplored area. What are the concomitants of interest clarity, consistency, and strength? Research needs to focus on investigating other variables that have been found to be related to interest pattern structure, especially exploratory behavior and decision-making. How are consistent, well-defined, and strong interests developed? While we know from earlier studies that interests develop at an early age and are fairly stable over time (Carter, 1940, 1944; Darley & Hagenah, 1955; Strong, 1943; Taylor & Carter, 1942), there is clearly much to be learned about the process of interest development. Biographical inventories could perhaps be devised to ascertain relationships among childhood/adolescent experiences

and interest inventory scores. Research on younger subjects, junior high school students or early high school-aged students, would perhaps be productive in exploring relationships between career maturity and interest differentiation, consistency, and score elevation. Furthermore, longitudinal studies will be necessary in order to establish the nature of the relationships between relevant variables and interest pattern structure.

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FOOTNOTES

[1]The measures of differentiation, consistency, and score elevation utilized in this study were developed by Richard M. Jaeger.

[2]The transformation used here is based on the mean=50, standard deviation=10 scaling of GOT standard scores.

[3]This transformation was used because CDI scores are reported as standard scores with a mean of 100 and a standard deviation of 20.

APPENDIX A
Personal Data Form - CED 210

For each item, please fill in the blank.

1. Name: _____ 2. Social Security No. _____

3. Marital Status: _____ Single _____ Married
_____ Divorced/Separated _____ Widowed

4. Number of children: _____ 5. Gender: _____ Male _____ Female

6. Ethnic Group: _____ White, not of Spanish origin _____ White, Spanish origin
_____ Black _____ Asian, Pacific Islander
_____ American Indian, Eskimo, Aleut
_____ Other (specify) _____

7. Are you a student-athlete at UNCG? _____ Yes _____ No

8. What classification are you in school?
_____ Freshman _____ Junior _____ Graduate Student
_____ Sophomore _____ Senior _____ Other (specify) _____

9. Your major at UNCG: _____ _____ Undecided

10. What jobs have you considered doing after graduation? _____
_____

11. Are you employed now? _____ No _____ Yes, full time _____ Yes, part-time

12. If you are employed now, what is your occupation? _____
_____
How long have you been employed in this job? _____

13. Length of time you have been employed full-time: _____ Yrs. _____ Mos.
part-time: _____ Yrs. _____ Mos.

(Include summer jobs for which you have been paid.)

14. List the 3 most significant job positions you have held in the past (do not include your current occupational title).
Include the length of time you were employed in each one, and indicate if you were employed full- or part-time.

1. Title _____
Number of years employed _____
Was this job _____ full-time or _____ part-time work?
2. Title _____
Number of years employed _____
Was this job _____ full-time or _____ part-time work?
3. Title _____
Number of years employed _____
Was this job _____ full-time or _____ part-time work?

APPENDIX B
EDUCATION 210 - CONSENT FORM

The Counselor Education program's goal is to improve the quality of counseling and related services to students through research, education, and the dissemination of knowledge. To this end, we gather research data on students who enroll in our courses, analyze these data, and then report the results in summary form.

Participation in our research affords you certain rights. These include:

1. All information we collect is confidential. Students are never identified in our reports or publication.
2. No information about a student will be released to anyone without the student's written consent.
3. Any research we conduct adheres to the University's policy regarding the use of human in research; this policy is designed to protect your rights.
4. All data we collect is shared with and explained to each student.

I, _____ , give my consent to allow my test
(print name)
results from this course, CED 210, to be used for research activities aimed at advancing knowledge in the counseling field and improving University services to students.

_____ _____

Signature Date