

CAREER INTEREST TESTING, PSYCHOLOGICAL CONGRUENCE

AND THE UNDECIDED STUDENT:

A Follow-Up

by

Kathy Buckland Heer

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APPROVED:

Thomas H. Hohenshil - Chairman

Harriet Cobb

Patrick Murphy

Brian Warren

James Impara

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(ABSTRACT)

This study investigated the similarities between students who participated in the Career Interest Testing Groups at the Virginia Tech University Counseling Center and undecided students in general. Holland's Theory of Congruence was tested by examining the student's SCII and MBTI test results and doing a follow-up regarding achievement, persistence in school, changes of major and compatibility with final choice of major. The undecided students in this study resembled those in the literature on only two dimensions; having a low rate of graduation and a high incidence of personal problems. Holland's Theory of Congruence did not hold up with this group. A scoring system, which indicated the degree of compatibility between the choices of major and test results, was used and indicated no movement toward greater congruence as the students changed majors. For those who did graduate in highly congruent majors, better grades did not result.

The conclusion was that undecided students at a select

admissions university represent the more academically able and mature individuals among undecided students in general. As the literature predicted, this group did have a high drop out rate. The findings regarding Holland's Theory of Congruence have been mixed and the theory did not hold in this investigation.

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TABLE OF CONTENTS

	Page
ABSTRACT.....	ii
ACKNOWLEDGEMENTS.....	iv
TABLE OF CONTENTS.....	v
LIST OF TABLES.....	viii
LIST OF FIGURES.....	ix

Chapter

I INTRODUCTION.....	1
Rationale for the Study.....	7
Purpose of the Study.....	9
Research Questions.....	9
Operational Definitions.....	11
Limitations of the Study.....	12
Summary and Organization of the Study....	13
II REVIEW OF THE LITERATURE.....	15
Studies on the Undecided Student.....	15
Achievement and Indecision.....	25
Choosing a Major.....	35
Strong Campbell Interest Inventory.....	40
Myers Briggs Type Indicator.....	44
Counseling Center Clientele	49
Summary.....	51

Chapter	Page
III METHODOLOGY.....	52
Description of the Sample.....	52
Treatment of the Data.....	54
Congruency-Incongruency.....	55
Research Design.....	55
Description of the Variables.....	56
Description of the Instruments.....	57
Strong Campbell.....	57
Myers Briggs.....	58
Data Collection Procedures.....	60
Statistical Analysis.....	61
Compatibility With Major.....	61
Persistence in School.....	62
Differences Between Undecideds and Tentatives.....	62
Pre and Post-Measures on SCII Compatibility.....	62
Achievement.....	63
Hypotheses.....	63
Summary.....	65
 IV RESULTS OF THE STUDY.....	 66
Description of the Sample.....	66
Hypotheses and Results.....	68
Compatibility With Major.....	68

Chapter	Page
Persistence in School.....	69
Differences Between Undecideds and Tentatives.....	72
Pre and Post-Measures on SCII Compatibility.....	74
Achievement.....	77
Summary.....	79
V DISCUSSION.....	82
Discussion and Implications.....	85
The Undecided Student.....	85
Congruence.....	87
CITG.....	89
Achievement.....	90
Conclusions.....	91
Recommendations.....	94
BIBLIOGRAPHY.....	96
APPENDICES	
A.....	107
B.....	108
C.....	110
D.....	111
E.....	112
VITA.....	113

LIST OF TABLES

Table	Page
1 Who Are the Undecided?.....	23
2 Compatibility With Major	
SCII and Final Major.....	70
MBTI and Final Major.....	70
3 Dropout Rate for Those Who Were Tentative and Undecided.....	71
4 Differences in Number of Changes of Major..	73
5 Differences in Academic Comfort Scores.....	75
6 SCII Compatibility.....	78

LIST OF FIGURES

Figure	Page
1 The Holland Hexagon.....	29
2 Career Interest Testing Group Summary of Participants.....	53
3 Graphic Representation of GPA/Congruence Interaction.....	80

Chapter I

INTRODUCTION

The time period from late adolescence to young adulthood is fraught with many difficulties. The psychological, sociological and educational literature have consistently agreed that this transitional period is characterized by developmental questions regarding purpose, self-identity and life goals. Research has often pointed to the psychological construct of identity as the best predictor of career indecision (Hartman & Fugua, 1982).

For the late adolescent who chooses to attend college, one of the first major decisions he or she is called upon to make relating to the issues of purpose, identity and life goals is the selection of an academic major. Students who have not yet selected a major are at a distinct disadvantage in terms of identity. They have no group or department on campus to affiliate with, coursework cannot be anticipated and the purpose of the the college experience is unclear.

Resolution of the questions of academic major and career choice is not only related to the successful transition to young adulthood, but also has been found repeatedly to be related to a student's decision whether or not to remain in college. For example, in a longitudinal study (Elton & Rose 1970) only 17% of the undecided freshmen

persisted to graduation, in contrast to 43% of those who had declared a career commitment, even though that commitment may have undergone later change. It is this fact that gives particular importance to the problem of the undecided college student in the 1980's. Furthermore, a study of college freshmen who withdrew although they were in good academic standing, indicated that 75% of the men and 45.1% of the women reported that they did so because they did not have definite plans for a major or a career (Timmons 1978). In a study conducted by Institutional Research at Virginia Tech in 1985 regarding the attrition of students in good academic standing, the most frequent reason cited for leaving was inability to get into a desired major.

The decline in the birthrate between 1963 and 1973 (U.S. Bureau of the Census, 1964 and 1973) has resulted in a diminishing pool of college age students in recent years. The decline in college enrollments may make the financial survival of many institutions dependent on the reduction of college withdrawals and the successful retention of students to graduation. The importance of improving retention rates has become more than a matter of academic interest. In fact, college presidents have ranked maintaining student enrollments second in importance on a list of twenty critical issues facing higher education (Duea 1981).

At Virginia Tech a period of growth in enrollments has ended and a maintenance period begun. The University is placing new emphasis on the quality of student life in an effort to attract and retain good students. Yet approximately one-fourth of each freshman class enters Tech with an undeclared major. Indeed, the University dismisses about 100 students each year because they have failed to declare a major by the beginning of the junior year. The overall rate of withdrawal per class is about 10% for students in good academic standing. This translates into about 1,000 qualified undergraduates who fail to re-enroll each year. It is not known how many of these leave because of pervasive career indecision.

Each year approximately 1500 students come to the University Counseling Center with concerns regarding their major. Many are counseled individually, others participate in a short two hour "Choosing a Major" workshop. About 250 students per year choose to participate in a lengthy program of testing and counseling. This Career Interest Testing Group (CITG) requires the student to have an initial contact with a counselor, take both the Strong Campbell Interest Inventory (SCII) and the Myers Briggs Type Indicator, attend a two hour group interpretation session and an individual follow-up session with a counselor. Each student completes an evaluation form at the

end of this process. From this source it is known that the participants in this program are predominantly sophomores from the College of Arts and Sciences who reside on campus, with females making up 60% of the group and males about 40%. It is this segment of "undecided" college students that was addressed in this study.

At first glance determining who the undecided college student is seems a clear-cut issue. Yet the majority of reported data agrees that undecided students are a heterogeneous population with few characteristics in common. The numbers of undecided students are on the increase. In a ten year nationwide comparison of college freshmen Austin (1979) found that the number of students claiming to be "undecided" increased from 5.5% in 1969 to 20.8% in 1979. This may have been due to the economic and sociological changes in the work world of the late 20th century. In a technological and service oriented economy with increasing specialization, choosing a career direction and/or college major is quite confusing.

Students may be undecided about a career direction for a variety of reasons. Many researchers have looked at indecision in this area as merely a symptom of a more serious psychological disfunction. It is important to distinguish between the student who is truly career undecided and those who have consciously chosen "undecided"

as an option on their college applications. For the student who checks "undecided" on their college applications this could be an admission of chronic indecision or it could merely represent a mature decision not to close off any options too soon until more exploration is done. Looking at only those who have put "undecided" on their college applications leaves out those who simply put some major down for appearance sake, but are also undecided. It does not include those who have retracted a first choice and are now undecided about what to pursue next.

Very
-
long

Another issue related to student indecision and the high risk of attrition from the university setting is Holland's Theory of Congruence. Holland (1973) and others have shown that if an individual has an accurate perception of himself, he or she will seek environments congruent with his/her personal orientation. In other words artistic people prefer artistic environments, intellectual people seek intellectual environments and so on. To simplify things Holland has conveniently divided the work world and people into six basic categories. These categories are Realistic, Investigative, Artistic, Social, Enterprising and Conventional (RIASEC).

According to Holland's theory an academic major can be considered as an environment. A specific major

encompasses a faculty with related interests, a departmental atmosphere, coursework of a given nature and a group of students pursuing a similar goal. A poor match between student and academic major could lead to frustration and indecision. Holland (1973) has reported that congruent person-environment interactions are conducive to personal and vocational stability, satisfaction and achievement.

The modern SCII is organized along the Holland coding of interests (RIASEC). It is one means of categorizing the interests of students who take this test in a career counseling situation. Holland's Theory of Congruence can be evaluated with the undecided group of students who participated in the CITG at Virginia Tech. The CITG provides an opportunity to determine if measured interests are a good predictor of final major.

The SCII is a test of measured interests. The belief has been strong that interests are a good predictor of an individual's selection, satisfaction and success in a given activity. Many studies have supported the hypothesis that interests have a great impact on the selection of a major curriculum (Morrow, 1971) and subsequent career choice (Barak & Meir, 1974; Strong, 1955). Furthermore interest seems to be one of the best predictors of persistence in a college major or an occupation (Campbell, 1971). On the

other hand diversity of interests or lack of interests may result in career indecision (Osipow, Carney & Barak 1976). These ideas have greatly influenced the use and purpose of career interest tests among which the SCII is the most widely used.

Rationale for the Study

Historically individuals attended college to become more broadly educated; now however, a college education is often considered preparation for a career. Students are assumed to enter college with a definite idea of the career path they wish to pursue. They are asked to declare a major course of study.

Research has often characterized the "undecided" college student as lacking a clear sense of identity, deficient in vocational maturity and less competent interpersonally (Holland & Holland, 1977). Many of these students seek help from university counseling centers to assist them in finding a career path so that they can declare a major. At the Virginia Tech University Counseling Center about 250 students per year choose to participate in an extensive testing program designed to help them choose a college major compatible with their values, needs and interests.

The Strong Campbell Vocational Interest Inventory (SCII) is the major test instrument used in the Virginia

Tech program. In a recent study on the predictive and concurrent validity of the 1981 Strong Campbell Interest Inventory, Hansen (1983) concluded that the SCII is much more predictive of college majors for students who are satisfied with their choice of major (decided) than for those students who are unsatisfied or undecided.

If personality dimensions are distinguishing factors between the decided and undecided college student, then certainly a personality measure of some sort should be used in any vocational test battery designed to assist the undecided student. At Virginia Tech the Myers Briggs Type Indicator (MBTI) is used for this purpose.

It was the intent of this study to examine the usefulness of the SCII in conjunction with the MBTI in determining a suitable course of study for undecided students who seek career counseling at Virginia Tech. It was hypothesized that those students who have personality "types" (MBTI) compatible with the interest code generated from the SCII and who declare a major compatible with both, will obtain a higher overall GPA, and have less disruption and fewer changes in their academic record and a higher rate of graduation than those who do not. On the other hand, students who choose or persist in a major indicated to be a poor risk by both the SCII and MBTI, will have a poorer academic record with more changes of major and a lower rate

of graduation.

Purpose of the Study

The purpose of this study was to determine how well Holland's Theory of Congruence, as it relates to career decision making and the undecided student, applies to undecided students at Virginia Tech. The intent was also to gain some useful information about undecided college students who utilize career counseling services that might contribute to career development theory and counseling practices for these students.

Research Questions

There were several fundamental research questions in this study. These questions come under five headings.

Compatibility of Major

Research Question 1: Among the students who persisted to graduation in this sample, what percentage have majors congruent with their test results and what percentage do not have majors congruent with their test results?

Persistence in School

Research Question 2: When the sample is divided into those who were truly undecided and those who had declared a tentative choice of major prior to taking the tests, will

the undecideds show a higher rate of dropping out?

Differences Between Undecideds and Tentatives

Research Question 3: Will those students who were initially "undecided" show more changes of major on their records during their four years at the university than those who had made a tentative choice upon entering Tech?

Research question 4: Will the undecideds have lower Academic Comfort Scores on the Strong Campbell than the tentatives?

Pre and Post-Measures on SCII Compatibility

Research Question 5: To what extent will those who made a tentative choice of major later change to a major more congruent with their SCII scores?

Achievement

Research Question 6: Will students who graduate in majors compatible with their SCII profile show overall higher GPAs than those who did not?

Research Question 7: If the sample is divided into the students who were initially undecided and who had made tentative choices, would there be a difference in overall QCA between those who graduated in a compatible major and those who did not?

Operational Definitions

The following terms are defined as they related to this study:

1. Career Interest Testing Group (CITG) - is a career testing program conducted at the Virginia Tech UCS in which students see a counselor, take the SCII and MBTI, attend a two hour group interpretation session and an individual follow-up session.

2. Undecided- this term will be used to describe any student who participated in a CITG and will refer to the general indecision of these students regarding the choice of a major. Undecided will also be used to specifically describe those who entered the University with no declared major.

3. Congruence - the extent to which either the SCII or the MBTI indicate the appropriateness of a major for a student. The degree of congruence will be indicated by a coding system. See Appendix C for a complete explanation of this coding system.

4. Incongruent - will mean the extent to which the SCII or the MBTI indicate that the major is not appropriate for a particular student. Again the coding system will determine the degree of incongruence.

5. Achievement- will refer solely to overall Grade Point Average (GPA) at the time of graduation from Virginia

Tech. To provide a more accurate indication of a student's performance, GPA will be covaried with high school grade point average.

6. Type - will refer to the sixteen possible personality types yielded by the MBTI.

7. Interests - will refer to the dominant themes yielded by the Holland Code (RIASEC) from the SCII profile.

8. Dropout - in this study, a dropout will be defined as any student who failed to graduate from Virginia Tech for whatever reason. It will include those who left or transferred in good academic standing as well as those students who left or were asked to leave because of poor academic standing.

Limitations of the Study

There are certain limitations inherent in this study. Since this study was basically a follow-up on students who had participated in a career interest testing program, it did not lend itself to tight laboratory control.

One limitation was that no control group was utilized to compare what became of students who were undecided at Virginia Tech but did not utilize the counseling center's career testing programs. The sample then, was not randomized but representative of the students who sought career counseling during the 1980-81 and 1981-82 school years. Lastly this research presumed that the CITG might

have had some treatment effect in influencing undecided students to choose a major appropriate to their interests and personality type.

This study was ex post facto in nature. Certain problems are inherent in this type of design. It is acknowledged that many factors influence the final choice of a major for a college student. These factors are financial, personal, parental, sociological, academic and geographic. It was assumed that these factors randomized themselves in the large sample size of this study and were not confounding elements.

Summary and Organization of the Study

In Chapter 1, the problems and issues surrounding the undecided student were discussed. The tests utilized in this research were also described and discussed. The rationale, purpose, and objectives of the study were presented. Chapter 2 contains a review of pertinent and related literature regarding the undecided student; achievement and indecision; and how students in general go about choosing a major. This chapter also contains a discussion of the Strong Campbell Interest Inventory and the Myers Briggs Type Indicator. A brief section is included on the particulars regarding counseling center clientele. The third chapter provides a comprehensive description of the investigative techniques of the study

including the details regarding the subjects, data collection and analytical procedures. A presentation of the results of the study comprises the fourth chapter and Chapter 5 provides a discussion of the conclusions with appropriate recommendations.

Chapter II

REVIEW OF THE LITERATURE

The literature as it relates to this study is diverse and voluminous. Therefore this review will be organized under three headings. First it is important to understand what is known about the undecided college student. A great deal of research has focused on this topic and much of it has attempted to discriminate between the decided and undecided college student on a variety of variables.

Secondly the literature relating to indecision and academic achievement will be reviewed. Career decidedness seems to be related to a variety of maturational and personality factors and academic achievement seems to be the element upon which the positive and negative effects of these factors can be measured. Dropping out of college is also a risk factor here. Lastly the literature regarding the major test instruments used in this study, the SCII and the MBTI, will be reviewed.

Studies on the Undecided Student

In reviewing articles for this section, an interesting pattern emerged. Literature relating to the undecided college student begins with a trickle of articles in the 1950's and increases to a flood between 1980 and the present. It seems safe to say that the undecided college

student is a topic of particular research interest at present.

This review begins with the 1964 study of the general problem of undecidedness by Holland and Nichols. They concluded that indecisiveness exists as a general personality trait for many people and that career indecisiveness is just one characteristic of this general pattern.

Ashby, Wall and Osipow (1966) built on Holland's work by attempting to determine what background factors might discriminate between the decided and undecided student. They found no differences between the two groups on first term GPA or SVIB group scores. They also found no differences between decided and undecided students on a number of background variables such as family income or parent's education. Furthermore tests of academic aptitude and Holland's Vocational Preference Inventory failed to discriminate. However, they did find that undecided students tended to have lower high school grades and a higher dependence score on the Bernreuter Personality Inventory. Although the sample of undecided students used in this study was small (N=29), the research was sound and set the stage for future studies that attempted to analyze and dissect the undecided student.

In 1969 Baird conducted an extensive comparison

between decided and undecided college students involving over 12,000 college freshmen on thirty-one campuses. He concluded that there was no real difference between the student who has decided on a vocation and those who have not. The only differences he could discern involved college goals. It seemed that undecided students more often than decided students emphasize the college goal of developing their minds and intellectual abilities and choose the goal of vocational or professional training less often.

During the 1970's researchers showed increased interest in determining the dimensions of the problem of undecided students. Elton and Rose (1970) reported a major discrepancy between the survival rates of vocationally decided and undecided college freshmen. Their research indicated that only 17% of the undecided freshmen persisted to graduation compared to 43% of those who were vocationally decided, even though that decision may have undergone later change. Furthermore the investigators found that 69% of the undecided students who persisted eventually graduated in majors that fell within Holland's (1966) Social or Enterprising categories.

"A confounding picture" was Harman's (1973) view of the research literature to that point on the correlates of indecision in college students. He surveyed personality,

interests and ability factors and found that very little differentiated those clients at a counseling center who had selected a major from those that had not. Finding this lack of results a little unsatisfying, he somehow concluded that undecided students were less positive about themselves.

Lunneborg (1975) compared undecided college students to those having decided upon a major using pre-college measures of achievement, aptitude and interest. It was concluded that none of these factors were particularly useful in predicting indecisiveness in college. Generally it held true that the least academically able high school students ran a greater risk of being undecided in college.

The next year Lunneborg (1976) continued her research by matching 127 vocationally undecided college graduates with those who had selected an occupation on sex, age, and college major and compared their responses on a senior survey. It appeared that the undecideds had a significantly lower grade point average, tended toward noncareer activities after graduation more frequently and were less satisfied with their college experience. Lunneborg goes on to comment that with ever increasing numbers of undecided students on campuses, counselors might do well to facilitate some sort of nonvocational orientation to the college experience.

By 1977 Hawkins, Bradley and White were able to definitively establish that anxiety levels in regard to decision making in general could be used with some success to predict educational-vocational undecidedness. This line of investigation which related anxiety to undecidedness had been hinted at as early as 1957 when Ziller suggested that the undecided student may value security and avoid risk taking more than the decided student. Crites (1974) suggested that anxiety might be responsible for beginning and perpetuating a vicious cycle of avoidance of tasks essential to vocational decision-making.

In 1977 Holland and Holland published the results of an ambitious study in which they attempted to clarify the controversy about the characteristics attributed to undecided students. In looking at over 1,500 decided and undecided high school and college juniors, they concluded that undecided students lack a clear sense of identity. They determined that a high Artistic score on the Self Directed Search seemed to be associated with being undecided, but why this was true was not clear. The results also indicated that there were many competent students who were undecided simply because their environmental situation did not require an immediate decision. In general the undecided student was characterized as lacking work experience, self-reliance,

and communication skills. They seemed less involved with peers, community and school. They tended to drop out, earn fewer credits, and get lower grades. They seemed to lack self confidence in their decision-making.

The Hollands go on to note that researchers may be too concerned with finding specific variables upon which to discriminate the undecideds. They agree with Crites (1969) that it may be most useful to consider undecided people as comprising multiple subtypes characterized by broad patterns rather than a single type.

The 1980's have yielded a wealth of articles relating to vocational indecision and the birth of a variety of test instruments to probe, measure and analyze it. Tango and Dziubon (1984) looked at multivariate relationships among the interest and personality patterns of indecisive community college students. Their findings suggest the existence of impossible agendas as a basis for career indecision.

A great many of the researchers who published articles from 1980 on, took the Hollands' and Crites' advice and looked at indecision in terms of multiple subtypes. Hartman and Fuqua (1983) provided an excellent essay on this point of view. Barak and Friedkes (1981) suggest that career counseling techniques be varied for increased effectiveness in working with the subtypes of undecided

students. In their work they have adopted the four indecision factors developed by Osipow, Carney and Barak (1975) as a basis for career indecision subtypes. These are (1) lack of structure, (2) perceived external barrier, (3) approach-approach conflict and (4) personal conflict. This factor structure was successfully replicated, thus giving it greater credence, by Hartman, Utz and Farnum (1979).

Cooper, Fuqua and Hartman (1984) undertook to prove that indecisiveness as a personality trait is related to vocational indecision and other interpersonal characteristics. While their research results were inconclusive, they did note that career indecision does seem to be a complex behavioral-psychological state that involves both an element of trait indecisiveness and vocational uncertainty.

Grites (1983) notes that in all the research on the undecided student, it is most important to distinguish between those students who are truly undecided and those who have chosen "undecided" as an option on college admissions applications.

Virginia Gordon (1981) assumes the stance that undecided students are simply "normal, growing, predictable individuals in various stages of vocational and cognitive development." She points out that although a wealth of

variables have been studied to determine who the undecided really are (see Table 1), the results have been contradictory and inconclusive. She urges counselors to reacquaint themselves with the developmental theories of Super (1957) and others prominent in the field of vocational counseling and to use these concepts in the day to day work of academic advising, career counseling, teaching and administration.

The research of the 1980's has largely been a refinement of the knowledge already established concerning the undecided college student. Brown and Strange (1981) continued to investigate the relationship of anxiety to undecidedness. They differentiate between the anxiety related to choosing an academic major and actually choosing a career. In their sample of college freshmen they found higher levels of anxiety associated with choosing a career path and simply choosing a major less anxiety provoking at that point. The authors speculate that "for the college freshman the selection of an academic major, while an immediate and convenient means for providing structure to the question of identity, does not necessarily resolve the larger question of what one will do beyond graduation. This latter question may seem remote, more complex and confusing to students at this age and therefore a source of greater anxiety."

TABLE 1

Some Variables Studied by Researchers to Determine
WHO ARE THE UNDECIDED?

Interests	Influence of significant others
Values	Sex
Abilities	Social and moral attitudes
Needs	Risk taking
Self-concept	Parents' income
Maturity	High School grades
Motivation	Extracurricular activities
Energy Level	Work experiences
College Rank	Parents' educational levels
Dependency	Life goals/aspirations
Dogmatism	College grades
Anxiety	Achievement test scores
Socio-economic level	Avoidance behavior
Size of high school class	Occupational information
	deficits
Attrition/retention	Decision making skills/ patterns/styles

The Holland code has also sparked a line of research related to indecision and "differentiation" between the highest and lowest scores on the six occupational scales of the Self Directed Search. There is some evidence that extremely high or low differentiation scores are related to undecidedness (Holland & Holland 1977, Lunneborg, 1975, Kazin 1977). However this area of research has created much controversy. Lowe (1981) concluded that interest differentiation on the Holland codes was not a reliable indicator of vocational undecidedness in his sample.

The concept of locus of control and undecidedness in college students has also been an area of investigation in the 1980's. Kishor (1981) suggested that those individuals with an internal locus of control might also be more decided about their careers. Cellini and Kantorowski (1984) agreed, and went on to suggest that "practitioners in career counseling might wish to consider the locus of control scores of their clients who are undecided about their career plans. For example, an undecided student may have an internal locus of control and the counseling intervention may be designed accordingly. To the extent that locus of control is a dependent variable (i.e. subject to change), counselors may also want to investigate the client's view of the world and help him feel more in control."

Achievement and Indecision

Academic success and persistence to graduation seem to be related to career and choosing a major decisiveness. On the other hand the undecided student is often at risk for poor achievement and dropping out of college. These relationships, as well as the investigation of just how students go about choosing a major have been the focus of much investigation.

First of all it is clear that being undecided is a stressor for many students. Archer and Lommin (1985) investigated personal and academic stressors on college campuses. A sample of 893 undergraduates completed a questionnaire on personal and academic stressors. Career choice was the fifth most frequent response among academic stressors and the ninth most frequent personal stressor. It was the only item to appear in both lists.

Many factors that have been related in the research literature to career indecision, have also been related to achievement in college. For example, Fanelli (1977) has suggested that internal locus of control is related to high achievement. Calsyn and Kenny (1977) related achievement in college to self-concept and Hansen (1977) has noted that while mild anxiety can sometimes benefit students, excessive anxiety can be debilitating.

In a 1981 study Romine and Crowell investigated the

personality correlates of under and overachievers at the university level. They determined the overachievers to be serious, hardworking, consistent self-starters with a need to excel. They were planful, organized and responsible students who did not procrastinate. The underachievers were the reverse image. It is not difficult to speculate as to which group might contain the most undecided students.

Holland and Holland (1977) determined that undecided students were more isolated from their peers, among other things. Booth (1983) investigated the relationship of loneliness to college GPA, ACT scores and gender. No significant results were obtained. So although lonely students and undecided students share many common characteristics such as lower self-esteem, poor problem solving/decision-making skills and a tendency toward an external locus of control (Yarkin et al 1981, Kukla, 1972), this does not apparently relate to achievement.

Another study (Altmaier, Rapaport, Seeman 1983) assessed the needs of liberal arts students on academic probation. At least 40% of the students surveyed cited each of the following factors as "often" or "almost always" interfering with their academic performance:

- * poor study habits or skills
- * failure to keep up in my coursework
- * lack of discipline or motivation
- * required courses I did not take

- * not scheduling my time wisely
- * uncertainty over my career goals
- * inability to concentrate.

Again a connection between achievement and indecision is indicated.

Another line of study that seems to be related to both achievement and career indecision is the so-called "College-Fit" Theory. Pantages and Creedon (1978) in an extensive review summarized the college-fit position by stating:

The evidence presented...strongly supports the "college-fit" theory, which stresses the interaction between student and institutional characteristics and its effect on persistence and attrition. The degree to which the attitudes and values of the student correspond with those of the institution is also the degree to which the student is likely to persist at that institution. It is clear that students have different motivations for attending different types of institutions. These facts suggest that different institutions attract specific types of students with specific personality traits of the student body, and these measures provide accurate predictions of attrition or persistence. (p.80)

Of particular interest to Virginia Tech is a 1983 study of college-fit and engineering students (Taylor and Whitstone). The authors suggest that profiles of academically successful students who "fit" chosen programs could be established for recruiting and admissions policies. This implies that "poor fit" between student and academic major (or college) could breed both indecision and poor achievement. This study did substantiate the concept

of college-fit theory and succeeded in identifying personal characteristics of successful engineering students at a military academy, a large agricultural college, a state university and a vo-tech school.

The College-Fit Theory seems similiar to Holland's theories of consistency and differentiation of interests and their relationship to achievement and indecision. Two diagnostic signs and theoretical constructs of Holland's theory are consistency and differentiation. Three letter interest code combinations are judged to be either psychologically consistent or inconsistent. Higher levels of consistency are determined by the degree of correlation and proximity of the types on the hexagon (see Fig. 1).

Higher levels of consistency correlate with greater integration of interest, competencies, values, traits, and perceptions. Holland (1973) postulates that individuals with high levels of consistency on their interest profiles will demonstrate greater achievement, stability, satisfaction and predictability.

The research regarding Holland's constructs of consistency and differentiation have been contradictory and mixed at best. In a study designed to test the consistency theory regarding the person-environment fit, Walsh et al (1976) looked at students and their academic adjustment. The students were categorized as congruent, incongruent or

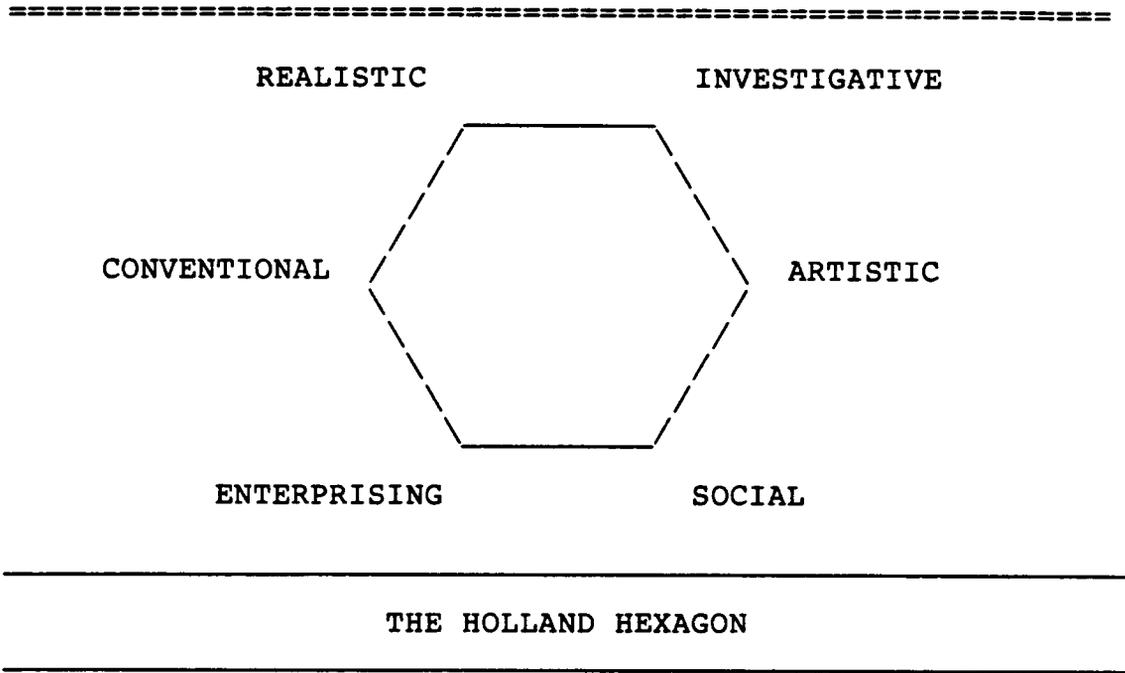


Figure 1

undecided according to their choice of major and interests as measured on the Vocational Preference Inventory (Holland 1965). It was concluded that incongruent and undecided students showed poorer academic adjustment when compared to students who were in majors consistent with their VPI scores. Furthermore the congruent students seemed to be more responsible, better organized and more motivated to reach their goals. The authors conclude that this study lends support to Holland's notion that congruent person-environment fit is conducive to more stable college major choices and better academic adjustment.

A number of studies have investigated congruence in relation to curricular choice and change. Curricular congruence has been examined in relation to several variables including environmental impact (Astin & Panos, 1969), stability and change (Holland & Nichols, 1964), personality and change (Elton, 1971) and direction of change (Walsh, Vandrin & Hummel, 1972). In general these studies seem to suggest that students who remain in an educational environment become increasingly "congruent" while those who change environments do so to become more congruent.

In a 1978 study of curricular change and congruency (Spokane et al 1978), it was determined that congruent students tended to be stable, disciplined and more

academically oriented than incongruent subjects. Furthermore, in this study Investigative types seemed to make congruent choices of major earlier and at a higher rate than Artistic types. However, the data suggests that while many students clearly changed majors in a more congruent direction, others did not.

It also seems appropriate to review some of the research on dropping out of college as it relates to the undecided student. The National Longitudinal Study of the class of 1972 has provided a wealth of information on various topics. A 1978 report (Peng & Fetters) from this database reviews the variables involved in withdrawal during the first two years of college. The data comes from the first and second follow-up of the high school class of 1972. They concluded that those students who persisted to graduation at a four year college came from a higher socio-economic level, had higher aspiration, ability and achievement than withdrawals. The authors go on to state: "College withdrawal, like many educational problems, can be best understood within the framework of a model in which varying background characteristics, personal attributes, and environmental influences interact to affect withdrawal behavior. The basic model for this study posits that withdrawal behavior is a function of additive main effects of student biosocial background, high school experience or

preparation, educational aspiration, financial support and college performance."

Another study utilized the same NLS data to look at college dropouts (Munro 1981). This author concluded that factors related to the integration of the student into the college's academic setting appeared to be far more important to subsequent dropout decisions than were factors related to integration into the social setting. In a general way this endorses the person-academic environment fit as crucial. Lastly the commitment of the student to the goal of college completion had the strongest positive effect on the decision to remain in school. It seems logical to add that goals and commitment to graduation are intimately related to the selection of a satisfactory major.

In reviewing the literature on college dropouts, it is clear that the definition varies. It can mean a student who does not graduate in the standard four years or one who leaves higher education altogether. It is important to distinguish between those who are dismissed from the university and those who leave on their own accord. Several studies (Cope et al 1971; Rose & Elton, 1966; Vaughn, 1968) suggest that such discrimination is important since they yield different patterns of academic achievement, motivation and other personality traits. Just

as the undecided student is difficult to characterize, so is the student who drops out.

Just as with the undecided student, much attention has been given to the personality characteristics of the student who drops out. Many traits are common to both. Persisters tend to have clearer goals as to what they want from college (Panos & Astin 1967, Trent & Medsker 1967); a greater practical orientation to life, higher orientation to scholarship, and lower overall feelings of anxiety (Trent & Medsker 1967). Persisters also seem to be more tolerant of dissatisfaction and more conforming than withdrawers (Feldman & Newcomb 1970, Cope et al 1971).

In a study of personality differences between persisters and withdrawers at a small women's school (Smith, 1976), it was determined that (a) there were no consistent differences on demographic factors and (b) that persisters differed from the withdrawers on social introversion, intellectual disposition and practical outlook. This study supported the notion that personality factors can discriminate, given the dynamics of a specific campus. The importance of person-environment fit, not only between student and major but between student and college is again suggested.

Just as with being undecided about a major, withdrawing from college is not always a negative thing.

Timmons (1978) offers the idea that it can be a positive step toward identity formation. He studied the withdrawers by dividing them into the transfers and those who withdrew failing versus those who withdrew passing. Timmons concluded that withdrawing may be an expression of rebellion against parents and a positive step in developing identity. When continuers were compared with withdrawers as a total group, the withdrawers emerged as significantly more dissatisfied with their lives at the time of admission. Male withdrawers stated significantly more often than continuers that they were not interested in their course work. Female withdrawers reported significantly more often that they felt lost at the university due to its size and impersonality. They reported feelings of isolation and loneliness more often. In the follow-up interviews the two most common problems reported by the males who transferred were a lack of interest in courses (64.3%) and no definite plans for a major or career (57.1%). The male withdrawers-nontransfers also reported these two problems as their most common difficulties.

For the female transfers, the two most common problems were "feeling lost" at a large university (55.0%). The withdrawers-nontransfers reported a lack of interest in courses (50.0%) and no definite plans for a major or a

career (43.7%). For both the men and women who withdrew from the university but were passing, the most common problem reported was not having definite plans for a major or career. Clearly Timmons' work at the University of Colorado gives us another dimension of the undecided student's profile.

The next topic to be explored under Achievement has to do with its prediction at the college level. Numerous studies have shown academic aptitude and previous high school achievement to be the most valid indicators of a person's success in college. Hills (1971) has suggested that one reason why non-intellective qualities do not add substantially to the prediction of college success is that "the qualities that are important for obtaining high grades in college also were important in obtaining high grades in high school. The high school record already is reflecting these personality traits, so no new measure of them yields a sizable increment of validity."

Choosing a Major

It seems relevant in this review of topics related to students who are undecided about a college major, to look at just how their counterparts go about choosing a major. What are the external and internal factors that influence this choice?

The issue of how students choose a college major has

been approached from a variety of directions. Perhaps one of the least known explanations has to do with cerebral lateralization theory. A 1982 study (Coren & Porac) predicted that fewer left-handed individuals would be found in majors that involve extensive verbal skills, such as literature or languages. Left-handed students might be expected to gravitate toward majors such as sciences or graphic arts that are less linguistically oriented. Four indexes of lateral preferences (handedness, footedness, eyedness and earedness) were measured in a sample of 497 university students. They found only that there was a 10% greater incidence of consistent right-handedness among students in the language and literature academic majors when compared to those in the sciences and graphic arts. It seems unlikely that cerebral dominance theory will contribute much to choosing a major.

On the other hand the role of profit in the choice of a college major seems a more promising avenue of research, especially for the 1980's college student. Milley and Bee (1982) investigated subjective profit assessment by undergraduate students of different majors and related the assessments to demographic characteristics. In other words, a college major produces various outcomes for a student. These may be monetary, high status or opportunity for rapid advancement. Change in majors is accounted for

by changes in the student's subjective profit assessments which may change over time. The students in this study were classified as either education or job output oriented. It was concluded that those students who choose job output majors were women, those paying for their own education, and those who graduated in the upper ranks of their high school classes.

Other factors clearly influence decision-making in choosing a college major. Hackett and Betz (1984) have provided support for the view that feelings of self-efficacy, as it relates specifically to mathematics, and is influenced by gender, socialization, math levels and background, is more strongly predictive of a math-related major and career choices than ability, math background or gender alone or in combination. Furthermore math anxiety, according to the self-efficacy approach, is an equally powerful predictor in the reverse.

The main body of research related to how individuals choose a college major has revolved around interests, just as it has in researching career choices. In an excellent review Barak (1981) notes the study of human interests has attracted many theorists because it has been widely accepted that interests or preferences should predict the choice, selection and achievement of an individual in certain activities. The belief has also been strong that

interests should be predictive of an individual's satisfaction in his or her chosen area. Various studies have supported the hypothesis that interests have an important impact on selection of majors in school (Morrow, 1971) and on career choice (Barak & Meir, 1974; Strong, 1955), while diversity, or lack of interests may result in indecision (Osipow, Carney & Barak, 1976). Yet Crites (1969a) has noted that "conceptual definitions of interests have lagged considerably behind operational definitions".

Theories of interests and interest development were almost all formulated between 1930 and 1960. Crites (1969a) classifies these theories into six major categories:

- 1) Interests are learned. (Strong 1943)
- 2) Interests are adjusted modes. (Carter 1940)
- 3) Interests are an aspect of personality
(Darley & Hagenah 1955; Holland 1959)
- 4) Interests are an expression of the self
concept. (Super 1949, 1954)
- 5) Interests are motives. (Darley & Hagenah
1955, Strong 1955)
- 6) Interests are multiply determined. (Roe
1957, Crites 1962)

Another area that has been popular in researching how students choose their majors, is the influence of values.

The literature on this topic has generally stressed either values of the chosen career or personal influences upon this choice. Rosenberg (1957) first suggested that people who enter different kinds of occupations have basically different outlooks on work as a facet of life. To some, work is an end in itself, valued for the opportunity it gives to express oneself directly. To others work may be only a means to obtain leisure and luxury off the job. To still others, work is of value for the chance it provides to deal with people or be of service.

Simpson and Simpson (1960) investigated the influence of values on occupational choice among college students. Among students in the business majors there was a clear tendency to value their chosen field as a source of income, and an opportunity for social interaction with leisure and luxury emphasized. These students were not interested in the social prestige of their occupations, in self-expression through work or the social contributions they might make through work.

Students planning scientific and esthetic careers stood in marked contrast to the business students. They showed strong motivation for success within the context of work, a strong commitment to their chosen occupations and the strongest identification with members of the occupation.

Students planning careers in the general cultural fields were less interested than the business students in luxury or genteel leisure and less interested than the scientific-aesthetic students in prestige and the approval of occupational colleagues. More than the other groups they tended to express an interest in social welfare issues.

Schwarzweiler (1960) stated, "It is generally agreed that values are social facts which influence the behavior of individuals, and, consequently, the structure and organization of the labor market."

Values, of course, must be inferred from behavior, that is from what people do and say. It continues to be an important, but underestimated factor in how today's students choose a major in college. Recent recessions in the economy seem to have spawned a generation of college students who value job security and money above all else.

Strong Campbell Interest Inventory

One of the primary test instruments used in this research is the Strong Campbell Interest Inventory. This instrument is the oldest psychological test in continuous use today, although it has undergone many revisions. Zytowski and Warman (1982) found, in a survey of university counseling agencies, that the SCII was used more frequently than any other measure for career counseling purposes. To accurately interpret the SCII, Campbell and Hansen (1981)

suggest examining the scales in a specific order: first the administrative indexes should be examined for indications of scoring or administrative errors; secondly the Special Scales should be examined for specific information; third, the General Occupational Themes, which classify the client into Holland's (1973) six personality types, should be examined. Lastly, the Basic Interest Scales and the Occupational Scales should be examined.

In an interesting study regarding the use of the SCII specifically with college students, Wigington (1985) notes that specific populations can deviate from the general norms on which the theory and standard interpretation of the SCII are based. For example, based on the correlations found in his study, the college student with a high percentage of "like" responses should have deviated General Occupational Theme Scores, a high Academic Comfort Score and a low Introversion-Extroversion score. This is different from what is usually found in the general population and norming sample. It still remains to be determined if the SCII needs to be interpreted differently for the college client or if existing interpretations are adequate.

The validity of the Strong Campbell Interest Inventory and its earlier forms has been a topic of study for three decades. The instrument was revised extensively in 1981

and new reliability and concurrent validity data suggests that this form of the test is comparable to previous forms of the test. The median test-retest correlation for the Occupational Scales for a sample tested over a two week period was .91, for a second sample tested over a thirty day period was .89, and for a third sample tested over a three year period was .87 (Campbell & Hansen 1981).

In an in-depth investigation of the 1981 SCII, Hansen and Swanson (1983) explored the usefulness of the SCII in predicting college majors and in examining the differential effects of stable and unstable interests during college on the validity of the SCII. The validity data indicated that the 1981 SCII is useful in predicting a college major and that validity rates found in this study were comparable to those reported in earlier SVIB-SCII research. However, since the relationship between majors and occupations is far from direct, exact comparison of validity rates with studies using occupational choice as the criterion are not possible. This study also yielded the information that the 1981 SCII is slightly more predictive for females than males. It also determined that the SCII is dramatically more predictive of college majors for those who are satisfied in their major or who have stable interests, than for those students who are dissatisfied or who have unstable interests.

In 1974 the Strong Campbell underwent a radical revision. One of the major changes in the SCII involved the introduction of Holland's theoretical framework for use in organizing, understanding and interpreting the scores and profiles (Holland, 1966). It involves the use of the six categories of occupational interests (Realistic, Investigative, Artistic, Social, Enterprising and Conventional). In a 1977 study, Catron and Zultowski attempted to determine if interest profiles based on the Holland system on the General Occupational Themes of the SCII could be found to characterize and differentiate students from four different academic divisions. These four divisions were Social Science, Humanities, Natural Science and Business. Not only were differences found among the four divisions on each of the six General Occupational Themes but very different patterns were found among the four divisions when the six General Occupational Themes were combined into profiles. The authors concluded that the Holland Themes greatly enhance the usefulness of the General Occupational Themes in distinguishing among various divisions of academic majors. In a study of expressed and inventoried vocational interests as predictors of college graduation and vocational choice, Holcomb and Anderson (1978) compared the stated choice of major among agricultural students with their SCII profiles.

When the student's declared major agreed with his SCII profile, this group was called congruent; when stated major and SCII profile did not agree, the group was called discrepant. A follow-up was done on graduation rates, eventual major and job placement. The discrepant group tended to have more changes of major but graduated at the same rate as the congruent group. The SCII did not appear to add anything to the students' expressed interests in predicting persistence in college. There was a trend in the follow-up data to suggest that congruent graduates more often took jobs that matched their majors.

Myers Briggs Type Indicator

The Myers Briggs Type Indicator is a self report inventory which was developed to measure the variables in Jung's personality typology. It has been one of the most popular personality inventories in the literature (Carlyn 1977) and seems to be gaining in popularity and use as time goes by. It consists of four scales: Extraversion-Introversion, Sensation-Intuition, Thinking-Feeling, and Judgement-Perception. The assumption underlying the MBTI is that every person has a natural preference for one or the other pole on each of the four scales and that based on these preferences much human behavior is orderly and predictable.

A number of researchers have investigated the

reliability of the MBTI. A variety of statistical procedures have been employed, making it somewhat difficult to compare findings. Carlyn (1977) summarized this research in an extensive article. After reviewing the diverse research she concludes that the reliabilities of the type categories are satisfactory although there is a wide range between conservative and liberal estimates of internal consistency.

In terms of the test-retest reliability the college populations appear to have maintained reasonably stable scores over a period of time, with a clear majority remaining stable or shifting in only one of the four indices (Stalcup 1968).

In Carlyn's summary of the literature, she also concluded that the MBTI has moderate predictive validity and good overall construct validity and notes that the instrument appears to be a reasonably valid and reliable measure that is potentially useful for a variety of purposes. Indeed a more recent study (Tzeng et al 1984) was forced to conclude that "the MBTI is a reliable instrument and that the 95 marker items in the Inventory would generate four distinct psychometric dimensions that are consistent with the theoretical constructs of the MBTI." The authors go on to add that "the MBTI can be used with confidence to distinguish separate personality types

in terms of the four dichotomous dimensions."

The MBTI literature is abundant with studies attempting to distinguish personality types specific to various occupations. A few of the more recent ones were reviewed. Rovezzi-Carroll and Fitz (1984) used the MBTI to determine personality differences among students in the various allied health fields. The results indicated that, although there is some homogeneity among students who major in the allied health fields, statistically significant differences exist on personality characteristics. Of the three fields examined, physical therapists obtained stronger Feeling scores while medical technology students had stronger Judging scores. The clinical dietetics students were similar to the physical therapy students on Feeling but resembled the medical technologists on the Judging dimension.

Gaster et al (1984) found a sample of retail store managers for a national merchandising chain to be heavily characterized by the Sensing-Thinking-Judging dimensions. Indeed 72.8% of the 316 managers surveyed were either the ESTJ or ISTJ type on the MBTI.

In a 1976 article appearing in Engineering Education, the psychological types most frequently found among engineering students was explored (McCaulley 1976). The author points out that if the MBTI was not a good measure

of Jung's theory, all college majors would be expected to have the same proportion of each type. This was not the case in this sample of 3,362 students of which 1,060 were in engineering. Among the students planning to major in engineering, Introverts outnumbered Extroverts two to one. On the second dimension the applied fields such as civil engineering had more Sensing types while those fields more concerned with theory, imagination and interpretation, such as nuclear and aerospace, had more Intuitive types. Thinking types predominate in the engineering curriculum and two thirds of the students were Judging types.

The MBTI has also been widely used in research as a means of predicting college major based on personality type. Although some relationship exists between personality and choice of college major, just as personality and occupational choice is related, studies of this phenomena have come to few definitive conclusions.

Todd and Roberts (1981) used the MBTI to determine differences between art education and music education majors. Significant differences were found ($p < .05$) between music and art education majors on the Sensing-Intuitive (S-N) scale and the Judging-Perceptive (J-P) scales of the MBTI. Of the sixteen possible combinations of psychological type, two cells contained 58.5% of the art education majors; the ENFP with 33.4% and the INFP with

25%. The music education majors were more randomly distributed across the sixteen types with the largest percentage (20%) being ENFJ. The authors conclude that while art and music education students are homogeneous to a large extent they do differ on certain personality factors as measured by the MBTI. They point out that "the music education student is trained to evaluate data quickly, working in small increments of musical elements until they are 'right', whereas the art education student is trained to suspend judgement, working intuitively until his flexibility produces the desired results."

Another study (Reynolds & Hope, 1970) attempted to determine if the MBTI could distinguish advanced level high school science students from the general population. It was concluded that introverts were higher than the extroverts in science achievement, although the data was not statistically significant. The data was consistent in the three samples utilized in the study. The intuitors scored higher than the sensors in both science achievement and the other variables examined (GPA and IQ).

Carskadon (1977) studied the test-retest reliability of the 1962 version of the Myers Briggs Type Indicator. Undergraduate psychology students were tested then re-tested eight weeks later. Correlation coefficients were calculated for continuous scores on each of the four

scales. Males and females were considered separately. Reliabilities were satisfactory and ranged from .73 to .87 with the exception of scores for males on the Thinking-Feeling scale ($r=.56$).

Counseling Center Clientele

It is pertinent to this study to briefly review the literature investigating differences between college students who do and who do not utilize the University Counseling Center. A recent article reported a needs assessment of Liberal Arts students on academic probation. Altmaier et al (1983) at the University of Iowa's Counseling Center, sent out a questionnaire to all students on academic probation and the return yielded some interesting information. Only 20% of the sample had ever used the services of the Counseling Center or its academic support programs. While the students who responded to the survey reported a variety of reasons for being on probation, most cited reasons for which interventions were available; the majority, however, were unaware of the availability of these resources. This might suggest that those most in need of career counseling services do not utilize them.

In an old but interesting study conducted at the Counseling Center of the University of California at Berkeley (Mendelsohn & Kirk 1962) the Myers Briggs Type

Indicator was used to determine differences between students who did and did not use the counseling facility. The MBTI was administered to random samples of the freshmen class during registration then a follow-up was done the sophomore year to see who had used counseling services. The clients and nonclients differed on the Sensation-Intuition and Judgement-Perception dimensions (significant at the .06 level), with the clients being more intuitive and less judging than the nonclients. There seemed to be distinct differences between the groups which are evident in their cognitive and perceptual approaches.

Tryon (1983) investigated the differences between students who utilize university counseling services and those who do not on the General Occupational Themes of the Strong Campbell Interest Inventory. The students in this study sought personal counseling, not career counseling. The authors concluded that counseled students scored significantly higher than noncounseled students on Academic Comfort and the Investigative and Artistic themes. Uncounseled students scored significantly higher than counseled students on the Enterprising theme. The results suggest that counseled students are more involved with school and interested in education. They also seem more introspective and open to problem solving (hence the Investigative theme) than uncounseled students. In

relation to this, a number of studies (Campbell 1965; Frank & Kirk 1975) have shown that counseled students graduate at a higher rate than noncounseled students.

Summary

This chapter includes the review of various topics in the literature that are pertinent to a discussion of the undecided college student. The dynamics of indecision and the characteristics of undecided students were presented and the relationship between indecision and achievement was established. Factors influencing the choice of a major was discussed. Lastly the relevant aspects of the two major test instruments, the SCII and the MBTI, were reviewed from the literature. Several studies pointing out differences between students who do and do not utilize university counseling services were presented.

Chapter III

METHODOLOGY

This chapter describes the specific techniques that were used to select the subjects and analyze the data. Figure 2 provides summary information about the subjects who participated in the Career Interest Testing Group at the University Counseling Center during the time period studied. The variables, research design and test instruments are described in detail.

Description of the Sample

The test results and academic histories were obtained for 326 students who had participated in the Career Interest Testing Groups at the University Counseling Center during the 1980 to 1982 school years. These students were selected because their records were available and they represent the graduating classes of 1984 and 1985. All seven colleges and all four undergraduate years were represented among the subjects. This sample was roughly two thirds female and one third male. Approximately half were freshmen when they sought career interest testing, with the greater proportion coming from the College of Arts and Sciences. Descriptive information about the participants in the CITG for the 1981-82 school year is presented in Figure 2. This group comprised half of the sample. Summary

Descriptive Information	1981-82 £ (%)
Sex:	
Females	149 (54%)
Males	127 (46%)
Class:	
Freshman	133 (49%)
Sophomore	85 (32%)
Junior	41 (15%)
Senior	6 (2%)
Graduate	5 (2%)
College:	
Agriculture	17 (6%)
Architecture	3 (1%)
Arts & Sciences	127 (48%)
Business	50 (19%)
Education	7 (3%)
Engineering	51 (20%)
Human Resources	8 (3%)
Residence:	
On Campus	188 (69%)
Off Campus	83 (31%)

CAREER INTEREST TESTING GROUP
Summary of Participants
1981-82

Figure 2

information for the 1980-81 school year was not available in the records. In comparing this sample to the general population at Virginia Tech, the females are clearly over represented, as are the freshmen and sophomore classes but otherwise the proportions are roughly equivalent.

Treatment of the Data

The information obtained for each of the 326 students in the sample was:

- A) From the Strong Campbell Interest Inventory;
 - 1) Academic Comfort Score
 - 2) The three highest Interest areas taken from the General Occupational Themes
- B) From the Myers Briggs Type Indicator; the four letter "type"
- C) From the Counseling Center confidential files;
 - 1) The declared major or status of the student at the time of the CITG
 - 2) If personal counseling had been recieved in addition to career counseling
- D) From the University Student records:
 - 1) High school and college GPA
 - 2) Graduation status (graduated or withdrew)
 - 3) The major the student was enrolled in at the time of either graduation or withdrawal

Congruency-Incongruency

Congruency-Incongruency was determined by checking the compatibility between the Interest code from the Strong Campbell and major at graduation or withdrawal and between the Myers Briggs type and major at graduation or withdrawal. The coding system described in Appendix C was used to determine the degree of congruency-incongruency. The majors at Tech are categorized according to the Holland code interest themes. This list of majors was generated using occupational listings from Holland's Dictionary of Occupational Codes. A few majors were arbitrarily assigned a Holland Interest code by the Career Committee at the Counseling Center based on knowledge of a specific curriculum at Virginia Tech. This listing of majors was organized to help students match their interests to an appropriate major in the CITG. Certain "types", according to the Myers Briggs research and theory, are considered compatible with various occupations. See Appendix B for a listing of the majors at Virginia Tech with their Holland Code and compatible Myers Briggs types.

Research Design

This study used an ex post facto research design which is widely used in education and psychology. Ex post facto research is a search for causes "after the fact" which Mouley (1970) describes as experimentation in reverse.

Kerlinger (1973) considers this type of design to be important in the educational realm where experimental inquiry is often impractical.

Description of the Variables

The features of the variables pertinent to this study are:

Major. College "major", that is the field of study in which the student was enrolled at the university. During the 1980 - 1982 period there were 74 possible undergraduate majors to choose from at Virginia Tech.

Interests. The three highest interest areas generated from the General Occupational Themes of the SCII were used to determine the measured interests of the student. A weighted score was used to specify the degree of compatibility between the major and the interest areas.

Persistence. Of importance to this study is whether or not the students in question dropped out or persisted to graduation.

Personality. The measurement of personality used here was the Myers Briggs Type Indicator which yields sixteen possible personality "types". A weighted score was used to specify the degree of compatibility between the major and the personality type.

Achievement. The grade point average at graduation (or at the time of withdrawal) constitutes the measurement

of the students' achievement. The High School GPA was used as a covariate.

Description of the Instruments

Strong Campbell Interest Inventory

The Strong Campbell Interest Inventory was used to obtain interest codes according to the Holland Code. The three highest General Occupational Themes (Realistic, Investigative, Artistic, Enterprising, Conventional) were obtained on each student from their SCII profile sheets on file.

The Strong Campbell needs little introduction. Cronback (1960) has said that the SCII is "undoubtedly the most highly developed and best understood of the inventories; indeed it ranks very near the top among psychological tests of all types." It is a widely used interest inventory for career counseling. It is the oldest test in continuous use in psychology and has undergone several revisions, the most recent being in 1981. It ranks fourth among all psychological tests in generating papers and empirical studies.

The SCII, contains 325 items to which the respondent marks "like", "indifferent", or "dislike". The inventory takes approximately 45 minutes to one hour to complete. Scores are categorized into 124 occupational scales and combined into 23 Basic Interest Scales. The scales are

grouped into the six General Themes developed by Holland (1966) and used by Strong. These six themes are (a) Realistic, (b) Investigative, (c) Artistic, (d) Social, (e) Enterprising and (f) Conventional.

The 1981 manual for the SCII (Campbell and Hansen) reports test-retest reliability and concurrent validity data. The median test-retest correlations for the Occupational Scales for a sample tested over a 2 week period was .91, for a second sample tested over a 30 day period it was .89, and for a third sample tested over a 3 year period the correlation was .87. While no interest inventory can approach perfect predictability, the Occupational Scales have a long history of research.

The Myers Briggs Type Indicator (MBTI)

The Myers Briggs Type Indicator is a self-report, forced choice inventory which was developed to measure the variables in Jung's personality typology. It consists of 126 items and generates four scales; Introversion - Extroversion, Sensation - Intuition, Thinking - Feeling and Judgement-Perception. It has been one of the most popularly used personality inventories in the literature (Carlyn, 1977). It has been widely used in business, industry, education and counseling.

The Myers Briggs "type", meaning the preferred way of operating on each of the four scales, was obtained from the

MBTI profile sheet on file for each student in this study. Sixteen "types" are possible from the various combinations of the four scales. See Appendix F for a description of the 16 types.

The MBTI is an inventory which requires about 45 minutes to complete. Scoring can be done either by hand or by computer. The number of answers, counted as weighted points, are tallied for each preference on the four scales. The greater number of points indicates the direction of the preference for each scale and hence the letter part of the preference score. The strength of the preference is computed by subtracting the smaller number of points from the larger. The difference score is converted into the strength of preference score by using a conversion table. The four interacting preferences of Introversion or Extroversion, Sensing or Intuition, Thinking or Feeling, and Judgement or Perception are used to generate the sixteen types.

Under the sponsorship of the Educational Testing Service, MBTI split-half reliability studies were conducted that showed correlations mostly in the .70 to .80 range. Tevy, et al (1972) conducted test-retest reliability studies on a two month interval and found correlations of the same magnitude. Validity testing was done with the Gray-Wheelbright Psychological Type Questionnaire which

also has a Jungian Personality Theory base similar to the MBTI. Correlations on the first three MBTI scales were .79, .58 and .60 (Myers, 1962). The GPTQ does not measure the fourth MBTI scale of Judgement versus Perception.

Data Collection Procedures

Names of the students who had participated in the Career Interest Testing Groups from 1980 to 1982 were obtained from records kept at the University Counseling Center. Every second name was selected for the sample. Results of the SCII and MBTI were obtained from the duplicate SCII form and MBTI answer sheet found in each student's file. Undecided status or declared major of each student at the time of attending the CITG was obtained either from the evaluation sheet each student had completed or from computerized University records. Also obtained from University computer records were high school GPA, college GPA, major in which the student graduated, or status at time of withdrawal, as well as the number of changes of major.

The following variables were recorded for each student: (a) sex, (b) Myers Briggs four letter "type", (c) the Academic Comfort Score from the SCII, (d) the three top interest areas from the General Occupational Themes of the SCII, (e) high school GPA, (f) final college GPA, (g) final major and (h) if the student persisted to graduation,

(i)major or status at the time of the CITG, (j) number of changes of major over the four years, (k) compatibility scores for both the SCII and MBTI for both first and final choice of major. It was also noted if the student had transferred to the University or had been seen at the Counseling Center for personal problems unrelated to career counseling. These variables provided the basis for analysis.

Statistical Analysis

Before any analyses were conducted, a coding scheme was devised to quantify the extent that the SCII and the MBTI were compatible with the first and final choice of major. The extent to which the student's final major was compatible with his or her interest code generated on the SCII is denoted by a score from 0 to 6. The same approach was used to denote the degree of compatibility between the major and the MBTI type. This was represented by a range of scores from 0 to 4.

Compatibility With Major

One of the primary research questions of this study is to what extent the students in this sample graduated in majors compatible with their test scores. To answer this question only a tally was needed. The weighted compatibility scores for the SCII and the MBTI were used

for comparison in a frequency table; the SCII scores of 4, 5 and 6 were considered high with 1, 2 and 3 considered low compatibility and 0 meaning no compatibility. For the MBTI no compatibility was indicated by a score of 0 and low compatibility by scores of 1 and 2. High compatibility was indicated by scores of 3 and 4.

Persistence in School

To determine if there were any differences between those students whose initial status was undecided and those who had committed to a tentative choice of major prior to attending the CITG, a second frequency table was generated.

Differences Between Undecideds and Tentatives

Two analyses were conducted to determine differences between these two groups of students who participated in the CITG. First, a t test was done to determine if the number of recorded changes in major was different for those undecided and tentative students who persisted to graduation. A second t test was conducted to determine if the Academic Comfort Scores, obtained for each student from the Administrative Index of the SCII, differed for the two groups.

Pre and Post-Measures on SCII Compatibility

In looking at just the students who had made a tentative commitment to a major prior to taking the CITG,

the compatibility of the pre-CITG major was compared to the SCII profile as well as with the final choice of major. The SCII compatibility score was used to weigh the compatibility of the pre and post choice of major. A t test for dependent samples was used to analyze the data. Furthermore a directional hypothesis was proposed for this analysis since it was presumed from the literature that students tend to change majors in a direction more compatible with the SCII profile.

Achievement

Lastly, the relationship between congruence, undecided or tentative status, and college grade point average was determined by using an analysis of covariance with high school GPA as the covariate. The undecideds were partitioned into two groups, those whose final major was congruent with their test results and those whose major was incongruent. The tentatives were partitioned into the same two groups for the analysis.

Hypotheses

Seven hypotheses were investigated in this study. They were categorized under five basic topics related to issues surrounding undecided students.

Compatibility of Major

Hypothesis 1: Of the students who persisted to gradua-

tion in this sample, a high percentage will graduate with majors highly congruent with their test results.

Persistence in School

Hypothesis 2: When the sample is divided into those students who are undecided and those who made a tentative choice of major prior to taking the tests, a higher percentage of withdrawals is predicted for the undecideds.

Differences between Undecideds and Tentatives

Hypothesis 3: Students whose initial status was undecided will have more recorded changes of major during their four years at Tech than those who made a first tentative choice.

Hypothesis 4: In comparing the Academic Comfort Score from the SCII for the two groups, it was expected that the undecided students would, on the average, score lower than those who made a first tentative choice.

Pre and Post-Measures on SCII Compatibility

Hypothesis 5: Students who made a tentative choice of major would have changed majors in a direction more congruent with their SCII scores by their Senior year.

Achievement

Hypothesis 6: Initially undecided college students who later graduated in majors incompatible with their SCII

profile would have lower overall grade point averages than the undecideds in congruent majors, or tentatives in either congruent or incongruent majors.

Hypothesis 7: Students who made a tentative choice of major and graduated in majors compatible with their SCII profile would have a higher overall QCA than the tentatives in incongruent majors or the undecideds in either compatible or incompatible majors.

Summary

This chapter describes the research methods that were used in this study. Descriptions of the test instruments, the research design and the variables were given. The data collection procedures and statistical analysis were also discussed. The hypotheses and anticipated factors affecting the findings were presented.

Chapter IV

RESULTS OF THE STUDY

In this chapter the statistical results obtained from the data analysis are given. The seven hypotheses listed in Chapter III were tested. The sample contained data on 326 individuals who participated in the Career Interest Testing Groups during the 1980-81 and 1981-82 academic years. The information collected on each student consisted of the Holland Interest Code and Academic Comfort Score from The Strong Campbell Interest Inventory; The Myers Briggs "Type"; major at the time of the CITG and at graduation; also high school and college grade point average. Additional information recorded included whether or not the student had persisted to graduation, was a transfer student or had been seen at the University Counseling Center for any personal concern other than career matters. The data were analyzed using the SPSSX statistical package for the Behavioral Sciences.

Description of the Sample

Of the students who participated in the CITG during the time period specified, every second name was included in the sample. Eleven subjects were dropped because they were working on second degrees or were graduate students. Of the 326 individuals in the final group, 127 were male

and 190 were female. Within this sample 54 were transfer students, meaning that nine or more hours of college credit was transferred to Virginia Tech. One hundred and eighty-six of the students in the sample graduated, while 140 did not. This is a 43% withdrawal rate compared to an overall withdrawal rate of about 28% for the classes of 1984 and 1985. Dropouts included any student who withdrew from the university prior to graduation and had not re-enrolled as of spring, 1986.

Two hundred and forty-six of the students in the sample had already made a tentative choice of major while 86 were listed as undecided at the time of participating in the CITG. The average high school grade point average for the group was 3.09 and the average college GPA was 2.48.

All 16 of the Myers Briggs types were represented with the largest percentage (13.5%) being ENFP. See Appendix D for a complete breakdown of the distribution of the sixteen types. On the SCII 97 of the possible 120 three letter combination codes (RIASEC) were represented with the Conventional-Enterprising-Social (CES) combination being the modal percentage at 5.2%. Academic Comfort Scores on the SCII ranged from 1 to 76 in this sample with a mean of 37.5.

Hypotheses and Results

Seven hypotheses were proposed. The results obtained from the statistical tests are presented as they related to each hypothesis.

Compatibility with Major

Hypothesis 1: Of the students who persisted to graduation in this sample, a high percentage will graduate with majors highly congruent with their test results.

This was a test of Holland's Theory of Congruence which, according to the literature, suggests that as students persist to graduation, their choice of major will move in a direction more compatible with their interests and personality.

The Compatibility score (compscore) system devised for this study allowed the assignment of a score to indicate the degree to which a student's final major was compatible with his/her SCII and MBTI test results. For the Strong Campbell, a score of 0 represented no compatibility, scores of 1, 2 and 3 indicated low compatibility and 4, 5 and 6 indicated high compatibility. On the MBTI no compatibility was indicated by 0, and low compatibility was indicated by scores of 1 and 2. High compatibility was indicated by scores of 3 and 4.

The percentages indicate that the greatest number of students graduated in majors of low congruence. The results of the chi-square indicate that the numbers obtained differ significantly from what one would expect to obtain by chance if selecting a major was random choice. Holland's theory suggests that a greater percentage would have graduated in congruent majors. This did not hold true for this sample of students.

The MBTI fared no better. Students did not tend to graduate in majors congruent with their personality type. Again the majority graduated in majors of low congruence. The chi-square for this factor was also significant. See Table 2 for these results.

Persistency in School

Hypothesis 2: When the sample is divided into those students who are undecided and those who had made a tentative choice of major prior to taking the tests, a higher percentage of dropouts is predicted for the undecideds.

Again this was a test of whether what is reported in the literature holds true with this sample of undecided students at Virginia Tech.

Table 3 shows the dropout and graduation rates for students who were tentative and those who were undecided in their choice of major upon entering college. A dropout was

Table 2.
Compatibility with Major

SCII and Final Major
Compatibility

	no	low	high
graduates (n=186)	n=13 7.0% exp.val. 62	n=124 66.7% exp.val. 62	n=49 26.3% exp.val. 62
<u>Chi-Square</u> <u>D.F.</u> <u>Significance</u> 103.45 2 p < .01			

MBTI and Final Major
Compatibility

	no	low	high
graduates (n=186)	n=9 4.8% exp.val. 62	n=101 54.3% exp.val. 62	n=76 40.9% exp.val. 62
<u>Chi-Square</u> <u>D.F.</u> <u>Significance</u> 72.99 2 p < .01			

Table 3.

Dropout Rate for those who were Tentative and Undecided

	Undecided	Tentative	
Dropped out	37 (43%)	103 (42.9%)	140
Graduated	49 (57%)	137 (57.1%)	186
	86	240	326

defined as any student who left the university for any reason and has not re-enrolled to date.

These results indicate that a student who had made a tentative choice was just as likely to drop out as a student who had made no choice at all. The percentages of dropping out and graduating for both groups are virtually the same.

Differences Between Undecideds and Tentatives

Hypothesis 3: Students whose initial status was undecided will have more recorded changes of major during their four years at Tech than those who had made a first tentative choice.

Changing one's major officially through University channels represents a decision. The literature suggests that undecided students are poorer decision-makers and will change their majors more often than those who had made a tentative choice but later became dissatisfied with it.

A t test for independent groups was conducted. The hypothesis was directional. The results are given in Table 4. There was no significant difference between the mean number of changes of major for the two groups.

Hypothesis 4: In comparing the Academic Comfort Score from the SCII for the undecideds and tentatives, it would be expected that the undecided students would, on the average, score lower

Table 4.

Differences in Number of Changes of Major			
<u>Group</u>	<u>Number of Cases</u>	<u>Mean Number of Changes</u>	<u>SD</u>
Undecideds	86	1.40	.93
Tentatives	240	1.20	1.11
		<u>T Value</u>	<u>DF</u>
		1.50	324
			<u>1-Tail Probability</u>
			.062

than those who had made a first tentative choice.

The Academic Comfort Scale from the SCII contains items that discriminate between students who do well in academic settings and those who do not. The average score for the college freshman norm group is about 40. (Manual, SCII, 1981). The item content is heavily oriented towards science and the arts. It seems reasonable to expect that the truly undecided students would have lower scores on this measure than those who made a first tentative choice they later rejected.

A t test for independent groups was used to determine any differences between the tentatives and undecideds. The results are given in Table 5. The hypothesis was directional. Again no significant difference was found between the undecideds and the tentatives on this measure.

Pre and Post-Measures on SCII Compatibility

Hypothesis 5: Students who had made a tentative choice of major would have changed majors in a direction more congruent with their SCII scores by their senior year.

For those students who had made a tentative first choice of major then discarded this major in favor of another, it was expected that the subsequent choice of major would be more compatible with the student's interests. Pre and post-CITG compatibility scores with the

Table 5.

Differences in Academic Comfort Scores

<u>Group</u>	<u>Number of Cases</u>	<u>Mean AC Score</u>	<u>SD</u>
Undecideds	86	36.89	13.59
Tentatives	240	37.75	14.30

<u>T Value</u>	<u>DF</u>	<u>1-Tail Probability</u>
-.48	324	.31

SCII were compared utilizing a dependent t test. The literature reports that students in general tend to make choices in a direction more compatible with their interests as they move towards choosing a final college major. This hypothesis was directional.

The mean compatibility score for the first choice of major for tentative students was 2.59. The mean compatibility score for the final major was 2.67. The mean difference was not significant. Those students who had made a first tentative choice then later changed majors and persisted to graduation, did not change majors in a direction more compatible with their interests as indicated on the SCII. Indeed there was no significant change at all. Possible explanations for this finding are offered in the following chapter.

For the MBTI, the mean compatibility score for the first choice of major was 2.40. The mean compatibility score for the second or final choice of major was 2.29. The mean difference again was not significant. In fact the direction of the change was opposite from what was predicted. Although the difference was not significant, there was some indication that the students tended to sacrifice their personality orientation when making a final choice of major.

Achievement

Hypothesis 6: Initially undecided college students who later graduated in majors incompatible with their SCII profile will have lower overall grade point averages than the undecideds in congruent majors, or tentatives in either congruent or incongruent majors.

Hypothesis 7: Students who made a tentative choice of major and graduated in majors compatible with their SCII profile will have a higher overall GPA than the tentatives in incompatible majors or the undecideds in either compatible or incompatible majors.

According to Holland's theory (1973), the greater the consistency between interests and major, the greater the satisfaction, stability and achievement for the student. With this theoretical basis in mind it follows that the initially undecided students who graduated in an incompatible major should show lower achievement than the other groups. Table 6 gives the groups and their mean grade point averages, standard deviations and cell sizes. The data analysis consisted of an analysis of covariance in a 2 X 2 factorial design with three levels of compatibility and two status levels (undecided and tentative) regarding initial choice of major. College GPA was covaried with

Table 6.

SCII Compatibility

(graduates only)

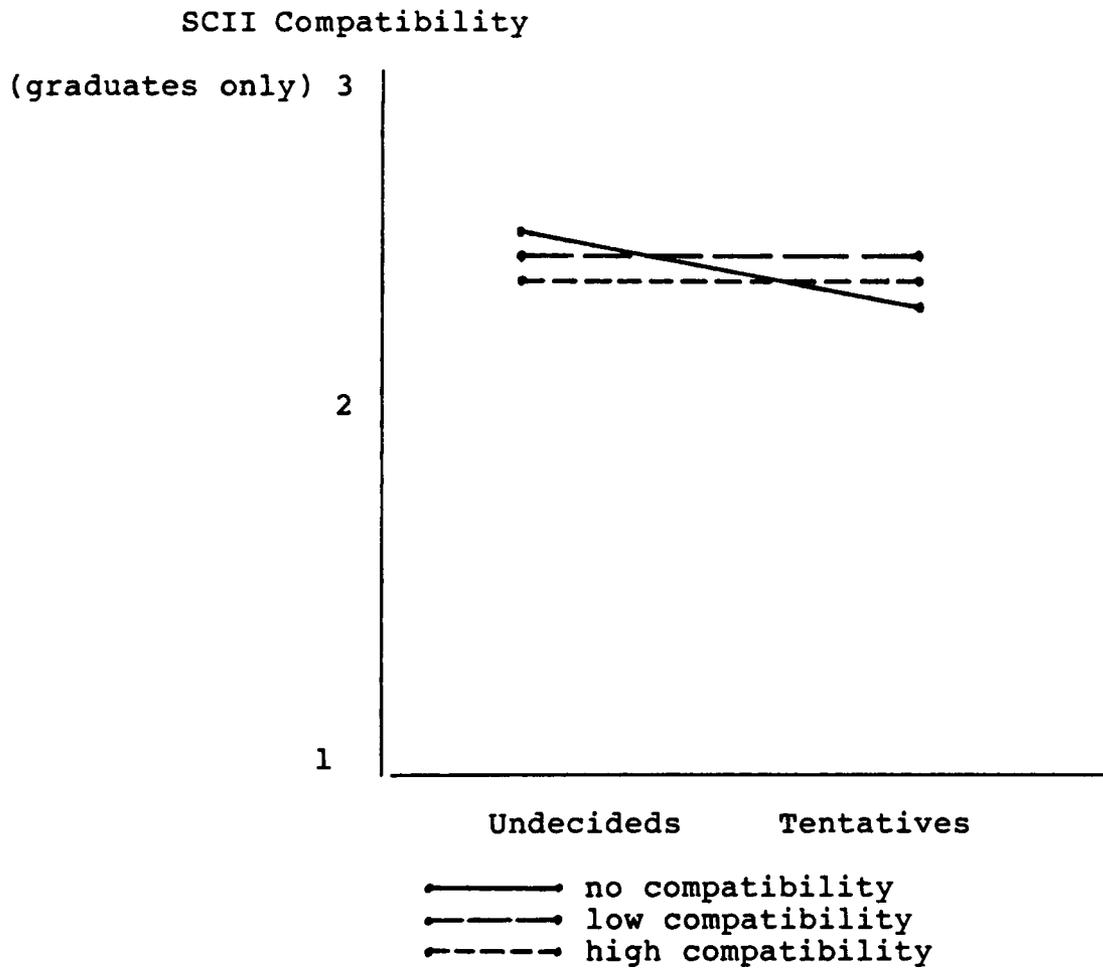
GPA	No	Low	High
Undecideds	2.63 n=4 sd=.25	2.53 n=31 sd=.48	2.46 n=14 sd=.46
Tentatives	2.38 n=9 sd=.42	2.52 n=93 sd=.52	2.44 n=35 sd=.43

high school GPA. This analysis was conducted only on those students who persisted to graduation.

There were no significant differences for either of the main effects, ($F=.708, p > 0.05$). In short there were no differences on college GPA across any of the independent measures when differences in high school GPA are controlled. There was a significant interaction however, which indicated that the undecideds graduated with better grades than the tentatives at the no congruence level ($F=3.376, p < .05$). The mean grade point averages for the two groups were plotted in Figure 3. The differences represented are only .25 of a point at most and may not be of any practical importance. Holland's predictions regarding achievement and compatibility did not hold true with this sample. Compatibility of major did not lead to higher achievement nor did low compatibility with final major lead to poorer achievement. This will be discussed more extensively in Chapter 5.

Summary

This chapter has attempted to give the statistical results of the analyses that were run to answer the research questions that were asked. In short, none of the results were significant. No significant differences were found to distinguish between the truly undecided student and the one who had made a tentative choice which later



GRAPHIC REPRESENTATION OF GPA/CONGRUENCE INTERACTION

Figure 3.

he/she rejected. None of the expected patterns regarding congruence and choice of major were found. Since these analyses were basically attempts to verify what the literature suggests is true regarding undecided students, serious questions are raised because this sample behaved contrary to what was expected. The following chapter will propose possible explanations for these findings.

Chapter V

DISCUSSION

The purpose of this study was to determine how well Holland's Theory of Congruence, as it relates to career decision making and the undecided student, applies to undecided students at Virginia Tech. It was assumed that students who participated in the Career Interest Testing Groups conducted at the University Counseling Center represented the broad category of "Undecided". Within this broad category the sample was divided into two subgroups, the truly undecided and those who had made a tentative choice but were dissatisfied with it. The literature suggests that there are distinguishable differences between these two groups in terms of maturity, decision making skill and achievement (Lunneborg, 1975 & 1976; Barak & Friedkes, 1981).

The results of this study however, revealed virtually no distinguishable differences between undecided and tentative students. The percentage rates of graduates and withdrawals for the two groups were nearly identical even though the tentatives outnumbered the undecideds. Moreover there were no differences between the two subgroups on persistence in school. This lends some support to Gordon's (1981) point of view that undecided students are simply "normal, growing, predictable individuals in various stages

of vocational and cognitive development."

Based on the literature it was expected that the undecided students would be less decisive than the tentative students (Cooper, Fuqua and Hartman, 1984). It was speculated that this might result in more changes of major for the undecideds. This did not hold true. The analysis revealed no differences in the mean number of changes of major over the four years at Virginia Tech. It was also hypothesized that undecideds would be less academically inclined, thus scoring lower on the Academic Comfort score from the SCII. The null hypothesis was not rejected, i.e., no significant differences were found between the mean Academic Comfort Scores for the undecideds and tentatives. The mean AC scores for the two groups differed by approximately one point and the scores were very close to the norm for college freshmen and sophomores.

Several tests of Holland's Theory of Congruence (1973) were also conducted. A scoring system was devised to rate the degree of congruence between a student's tested interests from the SCII and his or her college major. In comparing the first and final choices of major for the tentative students Holland's theory would predict that they would make choices in an increasingly compatible direction. This sample responded differently than expected. Although the mean compatibility scores seemed to indicate slight

movement towards greater congruence, this change was not statistically significant. Clearly many students either stuck with an incompatible choice of major to graduation or changed to a major as incompatible with their interests as the first choice.

All the students who persisted to graduation were classified into no, low or high compatibility categories with their final choice of major. Approximately 26.3% of the graduates had majors highly compatible with their SCII interest codes and about 40.9% had majors highly compatible with their MBTI type. On the other hand only 7% of the students graduated in a major of no congruence at all with their SCII interests. For the MBTI only 4.8% of the graduates finished in majors with absolutely no compatibility with their "type".

In examining the same theoretical supposition with the MBTI and the compatibility of personality type with choice of major, no statistically significant movement toward increased congruence was found. The mean compatibility scores in this realm suggest a slight movement away from congruence as students made their final choice of major.

Lastly the relationship between congruence and achievement was investigated. In looking at only those tentative and undecided students who persisted to graduation, it was expected that those with highly

compatible majors would have higher grade point averages. This did not hold true. In fact, the opposite was suggested by a significant interaction which indicated that the undecideds had higher grades than the tentatives, but only at the level of no congruence. One possible explanation for this finding might be that undecided students took general courses until they declared a major while tentatives labored in an uncompatible major from the start, thus possibly depressing their GPA. Undecideds may have gravitated towards the less demanding (but uncompatible) majors just to graduate with a degree. The tentatives may have transferred to similiar (but still uncompatible) majors to avoid loss of credits and extra time required to graduate.

Discussion and Implications

The results of the study will be discussed as they relate to five topics. These five topics are: the undecided student; congruence; the career interest testing group and achievement.

The Undecided Student

It was assumed in this study that students who participated in the Career Interest Testing Groups at the Counseling Center would represent undecided students in general. Of the factors that were investigated, this sample

represented the literature in that they were more likely to withdraw from school. Approximately half of the sample failed to graduate from Virginia Tech. This is almost twice the overall dropout rate for the classes of 1984 and 1985.

In examining characteristics of the sample it was discovered that one out of every five students who had participated in the CITG had also been seen at the Counseling Center for a personal problem of some sort. This is a much higher ratio than is found among the campus population at large. This finding may be related to research which has characterized the undecided student as more anxious, with poorer communication and social skills and less inclined to take risks (Holland & Holland, 1977; Cooper, Fuqua and Hartman, 1984; Hawkins, Bradley & White, 1977).

The students in this sample differed from what was suggested in the literature on the dimension of achievement. In terms of grade point average they were representative of their class as a whole. The mean high school GPA for the students in the sample was 3.09 with 68% of the group having GPAs between 2.71 and 3.47. Their final college GPAs were comparable to their classmates with a mean of 2.48 and 68% falling between 2.45 and 2.51. The college GPA included both those who persisted to

graduation and those who left the University. The high school grades were not surprising, given that Virginia Tech is a selective admissions university. The final college GPA suggests that this group of students' achievements were commensurate with their classmates.

Lastly, this sample differed from what was expected in that no factors discriminated between those in the group who had made a tentative choice of major but sought to change it, and those who had made no choice at all. Crites (1969) and others have stated that the undecided are really multiple subtypes characterized by broad patterns. In this sample, however, the division into only two subtypes was artificial. The tentatives could not be distinguished from the undecideds on graduation rate, grades, number of changes of major or Academic Comfort as measured on the SCII. Undecided students at large may represent several broad stereotypes but the group that utilized the CITG from 1980-82 were quite similar to each other.

Congruence

The intent of the Career Interest Testing groups at the Counseling Center is to help students learn more about their interests and personal orientations to assist them in choosing a major they will find satisfying. The Holland theory (1973) predicts that individuals who pursue career choices (including college majors) that are congruent with

their interests will demonstrate greater achievement, stability, satisfaction and predictability. Yet, the research regarding this phenomena has been mixed. In general most studies seem to suggest that students who remain in an educational environment long enough become increasingly "congruent" while those who change environments do so to become more congruent. In this study no retesting was done to see if the students' interests and personality orientation had shifted in their later years of college to become more congruent with a major they remained in.

Considering just those students in this sample who persisted to graduation, approximately 26.3% were in majors highly congruent with their measured interests on the SCII. The MBTI compatibility scores placed about 40.9% of the graduates as highly congruent with their majors. The interesting fact that resulted from this research is that very little change took place when the compatibility scores of first and final choice of major were compared for those who had made an early tentative choice. Even though the majority of the students in this sample changed majors at least once, the new choice was not any more or less compatible than the previous choice. Several factors particular to this campus may help explain this. Students at Virginia Tech tend toward technical majors. It seems

that when they do make a change of major often it is to a closely related area, such as from electrical engineering to computer science or from accounting to marketing. Few seem willing to risk a dramatic change to an entirely new area because it costs them too much in terms of credits lost and extended time to graduate.

It seems that many of the undecided students who finally choose a major but either can't make it academically or do not like it simply opt to leave the University. Poor "college-fit" (Pantages & Creedon, 1978) as well as limited options which meet the student's criteria for a new major seem the most plausible explanation for their departure.

CITG

All the subjects in this study were participants in the Career Interest Testing Groups at the University Counseling Center. All were classified as undecided students, at the time of the CITG, regardless of whether they had made a tentative choice or if they had made no choice at all.

The CITG is not an intense career intervention. Its real usefulness seems to lie in the fact that looking at interests and personality orientation gives the students additional criteria for making a decision about a major. The authors of the SCII admit that it is not especially

predictive of the career choices (or choice of major) of undecided students. Conclusive evidence is not yet available regarding the usefulness of the MBTI specifically with undecided students, but in this study it was roughly equivalent to the SCII.

The compatibility scoring system used in this investigation revealed that the students tended to make choices of major at about the same level of compatibility for both their interests and personality type. This compatibility level was approximately the same whether it was a first or final choice.

Achievement

Although most studies cite poor achievement as the predominant reason for students leaving college, that is only generally true at Virginia Tech. Statistics from the Office of Institutional Research indicates that attrition is most frequent at the sophomore and junior levels and only about half of those who leave do so because of poor grades. In terms of achievement this was true of this sample. Of those who had made no choice of major at the time of their participation in the CITG, 43% failed to graduate from Tech. Their average GPA at withdrawal was 2.45. Those who graduated in this subgroup of undecideds had an average GPA of 2.52. For those who had made a tentative choice which they were rejecting at the time of

the CITG, 43% also failed to graduate and had an average GPA of 2.44. Those tentatives who did persist to graduation had an average GPA of 2.49. There is certainly not much difference between these groups academically.

The students who participate in the CITG seem as academically able as their peers at this university. Not only do the high school and college GPA's reflect this but the Academic Comfort Scores from the SCII as well. Although the range of scores in this sample is quite large (from 1 to 76), the mean is 37.52. This is very close to what the SCII manual reports as the norm for college freshmen and sophomores.

Why then are these students leaving Virginia Tech? The data indicates that 4% of this sample were still without any choice of major when they left the University. It can be speculated that others were unable to get accepted into, or find a major they could commit to. It is also known that in this group many had personal problems since one out of five was seen at the UCS for personal concerns as well as career concerns. Clearly achievement did not play a prominent role in student attrition in this sample.

Conclusions

The results of this research have led to the formulation of several conclusions. Most of these

conclusions are specific to Virginia Tech, although they may generalize to other universities of similar admissions standards that provide similar testing programs through their Counseling Centers. Philosophically, it seems best to think of indecision among college students as a multi-dimensional factor. The mediating factors seem to be the social and economic "environmental press" (Pace, C.R., Stern, C.G., 1958) that influences the changing goals and values of a generation. Some indecision may be accounted for by poor "college-fit" (Pantages & Creedon, 1978).

Many of the studies of the 1960's and 1970's regarding undecidedness among college students reflect a different environmental press. Students of the entrepreneurial 1980's seem especially interested in status, occupational security and a certain guarantee of the good life (Milley & Bee, 1982). This is one explanation as to why Holland's Theory of Congruence did not hold up with this sample.

The Career Interest Testing Group however, appears to be a useful format. Students continue to rate it high in their evaluations and it offers many a rationale for choosing a major (i.e. interests and personality orientation) which they may not have previously considered. It is beneficial in that it forces these students to look at factors much more predictive about their future career satisfaction than the appeal of the salary and status the

major/career may offer.

It did not prove useful in this study to distinguish between those participants in the CITG who were undecided and those who had made a tentative choice. These subgroups both behaved as "undecided" and did not differ on GPA, Academic Comfort, dropout rate or congruence in this investigation.

Achievement (GPA), in regard to undecided students, is probably not a reliable indicator of anything, especially not compatibility or satisfaction with college major. At a very select university, academic achievement is governed by competition, the major, individual effort and the professor or course itself. All the students in this sample were admitted to the University on the same criteria as their peers so ability level is not the issue. Achievement seems to be governed by other factors for this group.

It is apparent from this study that many capable students do drop out. Establishing a major and becoming committed to it may be a much more important factor related to the attrition rate at Tech than is first apparent. The relatively high incidence of personal problems among this sample also points out the importance of the availability of counseling for the retention of this group.

Recommendations

1. Holland's Theory of Congruence did not "fit" the sample of undecided students in terms of greater achievement, stability or predictability, when the final choice of major was compared with interests measured on the SCII during the student's freshman or sophomore year. Yet, Holland and others (Holland & Nichols, 1964; Elton, 1971; Walsh, Vandrin & Hummel, 1972) have said that students who remain in an educational environment become more "congruent". It might be an enlightening avenue for further study to administer the SCII again during the senior year to determine if measured interests do shift in a direction more congruent with the major, for the students who persisted in an incongruent major.

2. Additional study is needed on the concept of "college-fit" and its role in indecision when choosing a major. It would be useful to follow up on the students who withdrew from the University in this sample to determine how many enrolled elsewhere in congruent majors or entered the workforce in congruent areas.

3. It would be useful to the University to explore those factors which influenced an initially undecided student to persist to graduation in an incongruent major. Is it factors internal to the student or external factors the

University could manipulate such as faculty advising and mentoring, departmental size or activities? This would be important information for the retention of high risk students.

4. In this study the distinction between undecided and tentative was not a useful one as both groups behaved essentially as "Undecided". Yet the literature is mixed on this issue. Further study is needed on this distinction and its usefulness in other collegiate settings such as community colleges or small liberal arts colleges.

5. Lastly, more study is needed on the Strong Campbell and the Myers Briggs and their usefulness with undecided college students.

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Appendix A

1. Agriculture
 - Agricultural Economics
 - Agronomy
 - Animal Science
 - Dairy Science
 - Poultry Science
2. Life Sciences
 - Biochemistry
 - Food Science & Technology
 - Forestry
 - Wildlife
 - Horticulture
 - Integrated Pest Management
3. Architecture
 - Architecture
 - Building Construction
 - Landscape Architecture
4. Liberal Arts
 - Art
 - English
 - Foreign language
 - History
 - Music
 - Philosophy
 - Theater Arts
5. Hard Sciences
 - Physics
 - Biochemistry
 - Biology
 - Chemistry
 - Geological Sciences
 - Mathematics
 - Nuclear Science
 - Statistics
 - Computer Science
 - Geography
6. Social Sciences
 - Communication Studies
 - Economics
 - International Studies
 - Liberal Arts & Sciences
 - Political Science
 - Psychology
 - Religion
 - Sociology
 - Urban Affairs
7. Business
 - Accounting
 - Economics
 - Finance, Insurance & Business Law
 - Management
 - Management Science
 - Marketing
 - Public Administration
8. Education
 - Agricultural Education
 - Business Education
 - Community Health Education
 - Elementary Education
 - Home Economics Education
 - Industrial Arts Education
 - Marketing Education
 - Physical Education
 - Secondary Education
9. Engineering
 - Aerospace and Ocean Engineering
 - Agricultural Engineering
 - Chemical Engineering
 - Civil Engineering
 - Electrical Engineering
 - Engineering Science and Mechanics
 - Industrial Engineering & Operations
 - Materials Engineering
 - Mechanical Engineering
 - Mining & Mineral Engineering
10. Human Resources
 - Textile Science
 - Fashion Merchandising
 - Family & Child Development
 - Housing & Resource Management (Consumer Studies & Interior Design)
 - Human Nutrition and Foods (Dietetics, Hotel & Restaurant Management)

Appendix B

UNDERGRADUATE ACADEMIC MAJORS AT VIRGINIA TECH
(ARRANGED BY HOLLAND CODES WITH COMPATIBLE MYERS-BRIGGS
TYPES)

Realistic Majors

Agricultural Education RSI, ISTJ or ESTJ
Dairy Science RIC, ISTJ or ESTJ
Forestry & Wildlife RIS, ESTJ
Industrial Arts Education RIS, ESTJ or ISTJ
Mechanical Engineering RIE, ISTJ
Mining Engineering RIE, ISTJ or ESTJ
Vocational-Industrial Education and Health Occupations
RIS, ESTJ or ISTJ

Investigative Majors

Aerospace & Ocean Engineering IRE, INTJ
Agronomy IRS, INTP
Animal Science IRS, ESTJ or ISTJ
Biochemistry IRS, INFJ or ISTJ
Biology ISR, ISTJ
Chemical Engineering IRE, INTJ
Chemistry IRE, INFJ or INTJ
Civil Engineering IRE, ISTJ
Clothing and Textiles (Textiles Option) IAR, INFJ or INTJ
Computer Science IRC, ISTJ
Economics IAS, ESTJ
Electrical Engineering IRE, INTJ
Engineering Science & Mechanics IRE, ISTJ or ISFJ
Food Science & Technology IRS, INTP
Geography IRS, INTJ
Geological Sciences IRA, INTJ
Integrated pest Management IRE, ESTJ
Horticulture IRS, INFJ
Materials Engineering IRE, ISTJ
Mathematics IAS, ESTJ
Math Education ISC, ESTJ
Nuclear Science & Engineering IRA, INTJ
Physics IAR, INFJ
Poultry Science IRS, ESTJ
Psychology ISA, INFP or ENFP
Science Education ISR, INFJ or ENFJ
Statistics IAS, ISTJ
Urban Affairs IRA, ESTJ

Conventional Majors

Accounting CES, ISTJ
Business Education CSE, ESTJ

Artistic Majors

Architecture AIR, INFP
 Art ASI, INFP
 Art Education ASI, ENFP or INFP
 Clothing and Textiles
 (Interior Design AIS, ESTJ)
 (Apparel Design AIS, INFJ)
 Communication Studies ASE, ENFP
 English ASE, INFP
 English Education ASE, ESTJ or ISTJ
 Foreign Languages ASE, INFP
 Foreign Language Education ASE, ENFP
 Landscape Architecture AIR, INSJ
 Music ASI, ENFJ
 Music Education ASI, ENFJ
 Philosophy ASI, INFJ
 Religion ASI, INFJ
 Theatre Arts AIS, ENFP

Social Majors

Community Health Education SIE, ESTJ or ISTJ
 Education SRE, ESFJ
 Elementary Education SAE, ESFJ
 Physical Education SRE, ESFJ
 Family & Child Development SIA, ESFJ or ESFP
 History SEI, INFJ
 Home Economics Education SAE, ESTJ
 Housing and Resource Management SER, ESTJ
 Human Nutrition & Foods SIE, ESFJ or ISFJ
 International Studies SRA, ESTJ
 Marketing Education SRE, ENTJ
 Political Science SIA, ENFP
 Social Studies Education SAE, ESTJ
 Sociology SIA, ENFP

Enterprising Majors

Agricultural Economics ECI, ESTJ
 Building Construction ERI, ESTJ
 Clothing and Textiles (Fashion Merchandising ESA, ENTJ)
 Finance, Insurance, and Business Law ECI/ESI/EAS, ESTJ or ISTJ
 Industrial Engineering & Operations Research ERI, ISTJ or ISFJ
 Management (Business) ESC, ESTJ
 Management Science EIC, ENTJ
 Marketing Management ESC, ENTJ
 Public Administration ESC, ESTJ

Appendix C

Strong Campbell Interest Inventory

STUDENT'S INTEREST CODE - ASI		
<u>Code of Major</u>	<u>Rule</u>	<u>Score</u>
ASI	All three letters match in perfect order	6
ISA	All three letters match but highest interest area not first	5
ASR or AEI	Two letters match with highest interest area first	4
SAR or EIA	Two letters match but highest interest area not first	3
AER or ACE	One letter matches with highest interest area first	2
EAR or RCA	One letter matches but it is not the highest interest area	1
RCE	Nothing matches	0

Myers Briggs Type Indicator

TYPE COMPATIBLE WITH MAJOR - ESTJ		
<u>Student's Type</u>	<u>Rule</u>	<u>Score</u>
ESTJ	All four preferences match major	4
ESTP	Three preferences match major	3
ESFP	Two preferences match major	2
ENFP	One preference matches major	1
INFP	Nothing matches	0

Appendix D

The Distribution of the 16 Myers Briggs "Types" Among
Undecided Students in This Sample

ISTJ 8.0% M=10.6% F=6.0%	ISFJ 6.4% M=6.2% F=12.3%	INFJ 4.6% M=2.9% F=3.8%	INTJ 2.8% M=4.3% F=1.9%
ISTP 3.4% M=6.8% F=2.2%	ISFP 4.9% M=5.1% F=6.1%	INFP 6.4% M=5.8% F=5.8%	INTP 5.5% M=5.8% F=1.9%
ESTP 4.9% M=6.5% F=2.6%	ESFP 7.4% M=5.4% F=8.5%	ENFP* 13.5% M=7.5% F=12.3%	ENTP 5.2% M=6.2% F=3.1%
ESTJ 7.1% M=11.2% F=7.5%	ESFJ 9.5% M=6.6% F=16.2%	ENFJ 5.2% M=3.7% F=6.8%	ENTJ 5.2% M=5.4% F=2.9%

* Breakdown of traditional age college students across
16 types by sex (Myers Briggs Manual, 1985)

Appendix E

Coding of Personal Problems Used at
the University Counseling Center

- P1 - The mildest form of emotional problem, e.g., mild homesickness, boy-girl relationships of a type in which the client is not "hurting" too much. It is a transient and mild situation. Mild is the key word for this diagnosis.
- P2 - This refers to a moderate degree of emotional disturbance-- a type that needs help. It differs from P1 in that it describes a situation that would not be likely to correct itself; i.e., it is not mild and/or transient. The word moderate typifies this category.
- P3 - Severe forms or situations of emotional disturbance. Deeply troubled clients with problems needing professional attention fall into this category. These clients may be seen in therapy by the individual counselor and frequently may be referred for psychiatric evaluation and/or care.

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