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dissertation entitled

THE DEVELOPMENT OF CAREER INTERESTS
FROM EARLY TO LATE ADOLESCENCE:
AN ECOLOGICAL APPROACH

presented by

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has been accepted towards fulfillment
of the requirements for

Ph.D. degree in Family Ecology

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Date 12/18/90

THE DEVELOPMENT OF CAREER INTERESTS FROM EARLY TO LATE ADOLESCENCE: AN ECOLOGICAL APPROACH

By

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A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Family and Child Ecology

1990

ABSTRACT

THE DEVELOPMENT OF CAREER INTERESTS FROM EARLY TO LATE ADOLESCENCE: AN ECOLOGICAL APPROACH

By

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This study examined changes in career interests from early to late adolescence within an ecological framework. The research was designed to (1) describe the career interests of early and late adolescents in relation to expert projections of careers of the future; (2) explore the influence of early adolescent career interests and other selected variables on the formation of late adolescent career interests; (3) explore the influence of early adolescent career interests and other selected variables on late adolescent career exploration; and (4) explore the influence of late adolescent career exploration and other selected variables on late adolescent interest in careers for the future.

Data for this study were gathered from the 1983 Michigan Early Adolescent Survey (MEAS I) and 1987 Michigan Early Adolescent Survey (MEAS II). The sampling procedure used was a stratified multi-stage cluster sample. The sample was selected using an equal probability of selection method (EPSEM). The principal instruments used to collect data for the MEAS I and MEAS II were a parent questionnaire and a child interview. Youths were interviewed in their homes while their parents completed questionnaires.

Stepwise multiple regression was used to test separate models for males and females. Career interests were defined in terms of Roe's (1956) field-level classification system, as well as the 1977 Dictionary of Occupational Titles (DOT) data, people, and things hierarchies. Career

exploration was defined in terms of a career exploration scale and careers for the future were determined by Bureau of Labor Statistics (BLS) employment projections, 1986—2000.

The male multiple regression models for late adolescent field—level interests, late adolescent data interests, late adolescent people interests, late adolescent things interests, and late adolescent career exploration were significant. Only the female multiple regression model for late adolescent career exploration was significant. The models for late adolescent interest in careers for the future were not significant for males or females. The overriding finding was that male and female career development from early to late adolescence are two separate and different processes.

Roe, A. (1956) The Psychology of Occupations. New York: Wiley.

For Donna . . . always

For my parents . . . you made it possible

ACKNOWLEDGMENTS

I want to thank my doctoral committee members for their efforts. Joanne Keith, Margaret Bubolz, Jean Schlater, Keith Adler, and Christine Nelson provided a standard of excellence in research and teaching that I have strived to attain.

Special thanks to Judy Pfaff and Susan Gibbons. Their assistance during the past few years is greatly appreciated.

For the support and love of my parents, Peter and Elizabeth, and my wife, Donna, I am forever grateful.

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CHAPTER 1
INTRODUCTION

STATEMENT OF THE PROBLEM

Early adolescence is a unique and critical time in human development (Kagan, 1972). Defined as the years between ten and fourteen years of age, early adolescence is a period of rapid growth and change. Along with the biological changes are psychological, social and emotional changes (Lipsitz, 1980). It is during this time that a child's abstract thinking expands and he or she can anticipate the future (Inhelder & Piaget, 1958; Piaget & Inhelder, 1969). A child's expression of career interest undergoes a similar transition from fantasy to realism during this same period (Ginzberg, 1972; Ginzberg, Ginsburg, Axelrod & Herma, 1951). All of these changes create an adaptive challenge specific to early adolescence that must be met (Lerner, 1987). For adaptation to occur, the early adolescent must adjust his or her changing self to his or her changing world. According to Hill (1980), each child must master the following developmental tasks of early adolescence:

1. Attachment—the transforming of childhood bonds to parents to bonds between parents and adult children.
2. Autonomy—the extending of self-initiated activity to wider behavioral areas.
3. Sexuality—the transforming of social roles and gender identity to sexual activity with others.
4. Intimacy—the transforming of acquaintances into friendships.
5. Achievement—the focusing of ambition into future-oriented and attainable goals.
6. Identity—the transforming of self-image to accommodate primary and secondary changes.

Career exploration is related to achievement. The early adolescent's increasing ability to anticipate the future makes it possible for him or her to link "present school achievement and other kinds of achievement to future possible achievements" (Keith & Hoopfer, 1983, p. 6). The ability to think abstractly coupled with increased interaction with the world outside of the home enables the early adolescent to explore

career possibilities. Exploration is an important antecedent to future decision making. As a youth moves through early adolescence into late adolescence and early adulthood, he or she makes decisions that open or close future options related to careers (Ginzberg, 1972; Ginzberg et al., 1951). Decisions about which classes to take, activities in which to participate and attitudes toward different jobs all impact later career choices and opportunities. During early adolescence, boys and girls become more realistic in their appraisal of occupations and their aspirations become part of the bank of knowledge from which they draw to make decisions about their future.

Studies suggest that early adolescents desire more information about career or employment options, but that most schools provide little information in this regard (Benson, Williams & Johnson, 1987; Carnegie Council,1989). Benson et al. (1987) state, "For whatever reasons, young adolescents show a high interest in future occupations" (p. 102). A Gallup survey (1988) of teenagers from 1977 to 1988 reports that teens are highly optimistic that "they will hold managerial or professional jobs, attain early success, and earn high salaries" (p. 5). Hedin, Erickson, Simon & Walker (1985) also found that teenagers have "extremely high career aspirations" (p. 5). For some, however, it will be very difficult to turn those aspirations into reality. The occupational choices, aspirations, ambitions, expectations and future roles of young people are shaped by a number of societal forces, especially within the family and school (Ginzberg et al., 1951; Hedin et al., 1985; Super, 1953). Thus, early adolescence is a pivotal time during which to study career development. Unfortunately, scientific study in this area is almost nonexistent. The attention of most researchers has been on late adolescent career development. The one study that focuses primarily on early adolescents examines age and sex differences among early adolescents on preference for eight career areas (see Erb, 1983). There is no attempt to tie Erb's study to any theoretical base.

In an age of rapid advance, careers are likely to change as frequently as the technology on which they are based (Wolkomir, 1985). Preparing today's youth for the jobs and careers of the 21st century is a major concern of parents, educators, policy makers and business leaders. The high school graduating class of the year 2000 is already in school. Futurists and career experts agree that the education and

training these young students receive today will determine their ability to find a job or career in the next century (Cetron, 1988; Kiplinger, 1987).

PURPOSE OF THE STUDY

The world is growing increasingly complex and competitive. Planning a career in a changing world is a difficult task. If the predictions of the teen-agers in the Gallup Youth Survey (1988) hold true,

> by the year 2000 the nation's labor force will be top heavy with 74 percent of its workers in professional, technical or managerial positions, and only 26 percent will be performing clerical, manual or agricultural labor. This would be a complete reversal of the workforce composition at the turn of the century when only 10 percent were engaged in the professions or managerial positions, and 73 percent of America's workers were employed in manual labor or agricultural pursuits. (p. 80)

Such a reversal could be a boon or bust to the economy, not to mention the lives of the individuals looking for work. Are the employment expectations and aspirations of today's youths practical? Will they possess the necessary skills to take advantage of the career opportunities of the future? Are we preparing our children for the careers of the future? This study proposes to address such questions. The purpose of this study is to identify the occupations youths are interested in today, compare those interests with the predictions of the careers of the future, and to identify the relationship between early and late adolescent career interests and career exploration.

RESEARCH QUESTIONS

To accomplish the stated purpose of this study, the following research questions were posed:

1.1 In what careers are early adolescents interested?

1.2 In what careers are late adolescents interested?

1.3 How do the career interests of early and late adolescents match future employment projections?

2. What is the relationship between late adolescent career interests and early adolescent career interests, gender, age, place of residence, and parents' occupations?

3. What is the relationship between late adolescent career exploration and early adolescent career interests, gender, age, place of residence, and parents' occupations?

4. What is the relationship between late adolescent interest in

careers for the future and late adolescent career exploration, gender, age, place of residence, and parents' occupations?

THEORETICAL FRAMEWORK

The theoretical underpinnings for this study rest upon Ginzberg, Ginsburg, Axelrod and Herma's developmental theory of occupational choice, Super's life-span, life-space approach to career development, Vondracek, Lerner and Schulenberg's developmental-contextual approach to career development and Bronfenbrenner's ecological approach to human development. Precedence for applying such a framework to the area of career development is drawn from Hamilton's (1982) "An Ecological Approach to Adolescent Development and Schooling" and Young's (1983) "Career Development of Adolescents: An Ecological Perspective."

Ginzberg et al. Developmental Theory of Occupational Choice

According to Ginzberg and his colleagues' theory of occupational choice, childhood fantasies about future jobs and occupations are an important aspect of career exploration and career development (Ginzberg, 1972; Ginzberg et al., 1951). The four researchers—an economist, a psychiatrist, a sociologist and a psychologist respectively—viewed occupational choice as a process delimited by life stages, in which early and late adolescents face certain tasks (Herr & Cramer, 1979).

Up to about age eleven, a child is in a fantasy period of occupational choice. During this period, a child imagines what he or she wants to be without any thought of his or her abilities or the requirements of different occupations. The period from eleven through seventeen is the tentative period of occupational choice. As the child moves through early and into late adolescence, he or she makes a transition from fantasizing to realistic decision making about career choices. During this period, occupational choice is subjective in nature, that is, the early adolescent's focus is primarily on his or her own interests, abilities and values. The tentative period is divided into four distinct stages. From eleven to twelve—the interest stage—the early adolescent makes choices in terms of his or her likes and interests. From thirteen to fourteen—the capacity stage—the early adolescent becomes more aware of the need to introduce realistic elements into his or her occupational considerations. During this time, an individual begins to consider his or her capabilities objectively. For the first time, an individual becomes aware of external

factors, such as the salary, prestige, preparation and training associated with different occupations. From fifteen to sixteen—the value stage—the adolescent attempts to find his or her place in society. During this time, the adolescent synthesizes many elements, such as his or her capabilities, career interests and societal rewards, and assesses these factors in light of his or her goals and values.

At about age seventeen, the adolescent enters the last stage of the period of tentative choices—the transition stage. According to Ginzberg et al. (1951), the school system dictates that this is a time of transition, because as the adolescent approaches the end of high school, usually about age seventeen, he or she must decide about the future in terms of work or college. It is not until about age seventeen or eighteen that the adolescent enters the realistic period of occupational choice. During this period, the late adolescent begins to search for a specific occupation and tries to match his or her interests and abilities with the requirements of a specific job. The realistic period is divided into three distinct stages. The first is exploration. During this time, opportunities are explored and options are checked. The second stage is crystallization. It is during this time that a generalized choice is made. The final stage is specification. This stage represents the process of closure. It is the period of final commitment to an occupational choice.

The major elements of Ginzberg et al.'s theory may be summarized as follows:

1. Occupational choice is a developmental process which typically takes place over a period of some ten years.
2. The process is largely irreversible: experience cannot be undone.
3. The process of occupational choice ends in a compromise between interests, capacities, values and opportunities.
4. There are three periods of occupational choice: (1) the period of fantasy choices, (2) the period of tentative choices and (3) the period of realistic choices.

Ginzberg et al.'s theory is developmental in nature in that as the child matures and gains knowledge by various methods and exposure, he or she passes through various stages (fantasy, tentative and realistic) of occupational choice (Lambert & Mounce, 1987). In 1972, the authors reformulated the theory in light of the intervening research and suggested that a life span developmental perspective is more appropriate for

viewing occupational choice. "Our reformulated theory is that occupational choice is a lifelong process of decision-making in which the individual seeks to find the optimal fit between his career preparation and goals and the realities of the world of work" (Ginzberg, 1972, p. 172).

Super's Life-Span, Life-Space Approach to Career Development

Although Super participated in the early stages of the theory formulation by Ginzberg et al., he quickly distanced himself from the four and offered the following criticism of their work:

1. The theory does not build on previous pertinent research.
2. "Choice" is not adequately defined.
3. There is a false distinction made between "choice" and "adjustment."
4. Although Ginzberg et al. concluded that the process of occupational choice is one of compromise, they did not study or describe the compromise process (Super, 1953).

After voicing his criticism, Super offered his own statement of a comprehensive theory of career development, which consisted of ten propositions concerning the structure and nature of career development. (In 1957, two more propositions were added and in 1984 the 12 propositions were modified and updated.) Since that 1953 article, Super's developmental approach "has received the most continuous attention, stimulated the most research, influenced most pervasively the field of vocational psychology" (Herr et al., 1979, p. 123). It is an approach that stresses the interaction of personal and environmental variables. Through the ongoing Career Pattern Study, Super and his colleagues have attempted to validate and refine the theory over time (see Super, 1953, 1957, 1969, 1980; Super et al., 1957; Super & Hall, 1978; Super, Starishevsky, Matlin & Jordaan, 1963). According to Super's perspective, career development can be described as a stage process with developmental tasks at each stage. The nature of these stages is not lockstep but cyclical—indicating that individuals in middle or later life may return to earlier stages of development. Figure 1 offers an overview of Super's conception of career development, however, only the interest and capacity substages of the growth stage and the tentative substage of the exploration stage are applicable to this study.

Life Stages and Substages	Developmental Tasks
1. Growth (Birth-14)	self-concept develops
a. Fantasy (4-10)	needs dominate
b. Interest (11-12)	likes determine aspirations and activities
c. Capacity (13-14)	abilities and job requirements are considered
2. Exploration (15-24)	self-examination and career exploration
a. Tentative (15-17)	needs, interests, capacities, values and opportunities are considered and tentative choices are made
b. Transition (18-21)	reality given weight; youth enters labor market and tries to implement self-concept
c. Trial (22-24)	first job; potential life work
3. Establishment (25-44)	effort to find a permanent position in an appropriate field
a. Trial (25-30)	attempt to secure a permanent position; possibility that life work will be series of unrelated jobs
b. Stabilization (31-44)	the creative years; effort made to stabilize
4. Maintenance (45-64)	concerned about maintaining present status
5. Decline (65-Death)	physical and mental powers decline; work changes and eventually ceases; retirement requires change in roles
a. Deceleration (65-70)	pace of work slows and duties change
b. Retirement (71-on)	leisure or disappointment

FIGURE 1: A Summary of Super's Life Stages and Developmental Tasks

Super's conceptualization of life stages and developmental tasks made explicit the integration of career development with human development. In 1980, to formulate a more comprehensive theoretical framework, he proposed a "life-span, life-space approach" to career development and presented a Life-Career Rainbow in an attempt to describe more adequately the many aspects of a career across the life span. Within this framework, a career is defined as the combination and sequence of roles played by a person during the course of a lifetime. Included in these roles are those of a child, pupil/student, leisurite, worker, citizen, spouse, homemaker, parent and pensioner, as well as such less common roles as those of a criminal and lover. The Life-Career Rainbow was put forth as a means to conceptualize the multidimensionality of a career in terms of the temporal importance of and emotional involvement in a role. Super hoped that the life-span, life-space approach to career development would "lead to theories which are more comprehensive than the segmental theories which now dominate the field" (Super, 1980, p. 283). A review of the relevant literature has not shown this to be the case.

The Life Span Perspective on Human Development

According to Hill & Mattessich (1979), the major focus of the life span perspective is development over time—individual; family; chronological; historical. Individuals grow, develop and change over time. As they grow and develop, they move through a series of life-cycle stages, and each stage has its own characteristic developmental tasks and patterns of interaction. Havighurst (1953) defined developmental task as

> "A task which arises at or about a certain period in the life of the individual, successful achievement of which leads to happiness and success with later tasks, while failure leads to unhappiness in the individual, disapproval by society, and difficulty with later tasks" (p. 2).

The developmental task concept can be used to describe the set of demands with which society confronts individuals when they reach certain levels of biological, educational and vocational attainment. Some tasks are considered critical for successful movement through the life-cycle. Thus, a developmental task may be viewed as the skills, knowledge, functions and attitudes that must be acquired at certain points in life and

are mastered through physical maturation, social learning and personal strivings (Lambert, Rothschild, Atland & Green, 1978).

The two key propositions or assumptions of a life span view of human development are embeddedness and dynamic interaction (Baltes & Reese, 1984; Lerner, 1987). Embeddedness means that the key phenomena of human life exist at multiple levels of being. Dynamic interaction means that developments and/or changes at one level influence and are influenced by developments and/or changes at other levels. Thus, a life span view assumes that developmental change is (1) potentially a life span phenomenon; (2) involves a contextual view of the person; and (3) requires adaptation of the changing person to his or her changing world.

The life span perspective on human development provides a rich framework for the consideration of early adolescent development (Petersen, 1987), however, a major limitation of this approach is lack of focus on the environmental context in which human development takes place. Citing the study of adolescents in particular, Vondracek & Lerner (1982), Vondracek, Lerner & Schulenberg (1983) and Vondracek & Schulenberg (1986) suggest that the existing life span models of career development are inadequate since they fail to address the "multidimensional, plastic, contextual, and life-span" features of development. To remedy this situation, they have proposed a "developmental-contextual" approach to understanding career development in adolescence. This perspective is based upon the developmental-contextual approach articulated by Lerner (1984, 1987).

A Developmental-Contextual Approach to Career Development

Many of the emphases of the developmental-contextual approach have been reflected in Super's (1980) life-span, life-space approach to career development. "Super's theory has very different roots, however, from the developmental-contextual approach to career development, which is derived from the contributions of life-span human development and developmental psychology" (Vondracek et al., 1986, p. 249). From a developmental perspective, "events prior to adolescence need to be considered as possible antecedents of vocational development; in turn, adolescent developments provide key antecedents of development in later life" (Vondracek et al., 1982, p. 604). This thinking supports the central thesis of this study, that is, early adolescence is a separate stage

of human development and as such the career interests of early adolescents need to be considered as possible significant antecedents to late adolescent career interests. In turn, adolescent career interests provide key antecedents to successful career development in later life. From a contextual perspective, "the individual characteristics of the developing adolescent must be considered in relation to the particular features of the context within which the person is developing" (Vondracek et al., 1982, p. 604). Thus, a developmental-contextual perspective

1. incorporates not only the social environment, but also the cultural and physical environments
2. tries to account for the ever-changing characteristics of the environment
3. views the individual as not just a passive participant on which the environment has impact, but rather as a participant involved in a mutual relationship with the environment that is capable of producing change in the environment as well. (Vondracek et al., 1986, p. 250)

The major shortcomings of this approach are in the implementation of these conceptualizations. According to Vondracek et al. (1986), "One promising avenue for accomplishing this may be to adapt Bronfenbrenner's (1979) framework for studying the 'ecology' of human development" (p. 252). This study attempts to remedy the shortcomings of current career development theory through the integration of Bronfenbrenner's ecology of human development with a life span approach. A life span, ecological perspective of career development provides a comprehensive framework for the study of early adolescents in interaction with their environment over time.

The Ecological Perspective on Human Development

Ecology is the study of the interrelationships between organisms and their environment (Andrews, Bubolz & Paolucci, 1980). The environment is the sum total of the physical, biological, social, economic, political, aesthetic and structural surroundings of an organism. The organism, its environment and their interaction is called an ecosystem (Bubolz, Eicher & Sontag, 1979). Human ecology is the study of human ecosystems. In the words of Visvader & Borden, it is the study of the relationship between humans and nature. Family ecology is a field of human ecology. The domain of family ecology is the interactions of humans with their near environment in the family, and the interactions of the family and its environments. Thus the family is viewed as both an

environment for the individual and as being within larger environments itself.

In his book, The Ecology of Human Development, Bronfenbrenner advanced the study of human development from an ecological perspective. Development is addressed in terms of the increasing ability of a person to understand and act upon his or her environment and "the interaction between person and environment is viewed as two-directional, that is, characterized by reciprocity" (Bronfenbrenner, 1979, p. 22). Bronfenbrenner described the individual's environments as a set of concentric structures, each inside the next, like a set of Russian dolls. These structures are the micro-, meso-, exo-, and macro-systems.

The Microsystem

This system consists of the settings and interactions in which individuals experience and create day-to-day reality. The microsystem considers interactive processes in which at least one party is the developing adolescent. Based on the aforementioned works of Bronfenbrenner (1979), Hamilton (1982), Hill (1980) and Young (1983), the three major microsystems in which adolescent development occurs and which are significant to career development are the family, school and peer group. Figure 2 graphically represents the microsystem in the context of adolescent career development. The developing adolescent is represented by the change over time that occurs between early and late adolescence. The developmental tasks of attachment, achievement and identity require that as a youth moves through adolescence, he or she should move out into the world and spend less time with his or her family. Thus, the family is shown in the model to shrink, whereas the school and peer group grow. This does not mean that the family is less important. It is only illustrative of the growing influence of the world outside of the home.

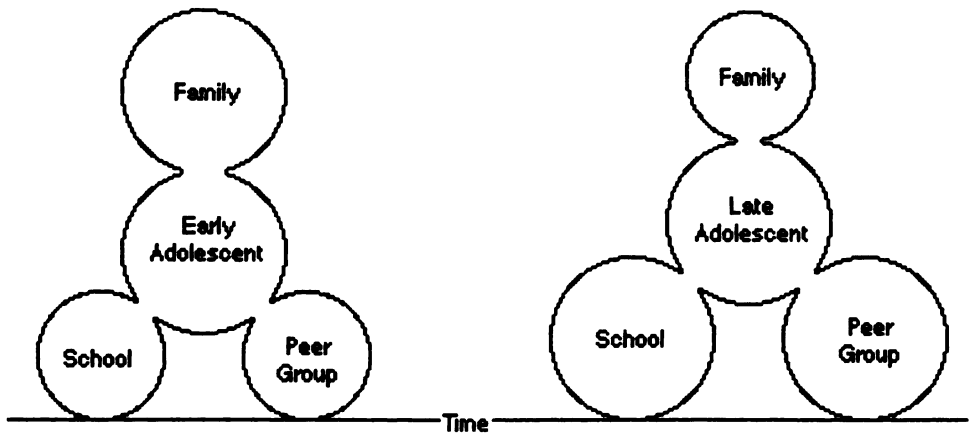

FIGURE 2: The Microsystems of Adolescent Career Development

The Mesosystem

The mesosystem represents the set of interrelationships between two or more microsystems in which the developing person is an active participant. The interrelationships between the microsystems in this model comprise the adolescent's mesosystem. The interrelationships among the adolescent's family, school and peer group is depicted in the model by the community in which the adolescent functions. According to Young (1983), the potentially fertile context that the mesosystem provides for the career development of adolescents has not been adequately researched.

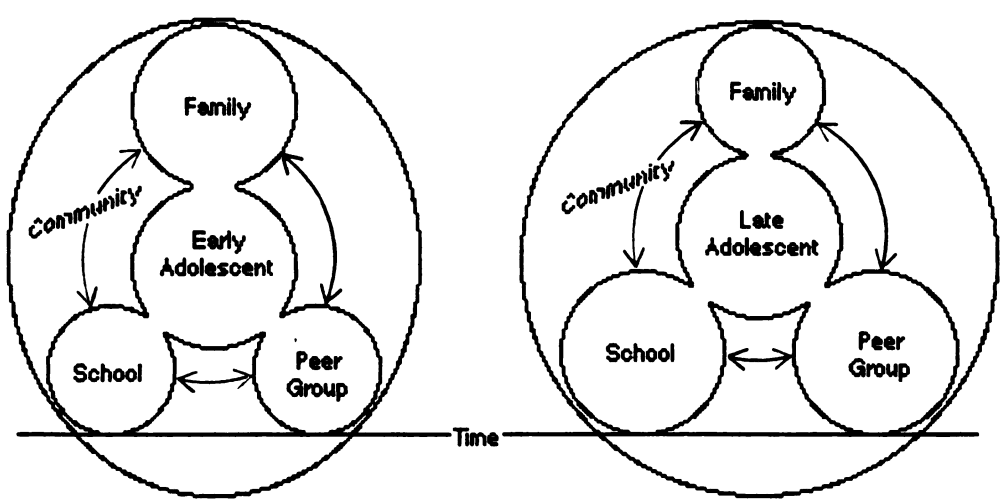

FIGURE 3: The Mesosystem of Adolescent Career Development

The Exosystem

The exosystem are settings that do not directly involve the early adolescent, but can affect (or be affected by) things that happen in the setting containing the youth. In this model, the exosystem is represented by parental employment and mass media.

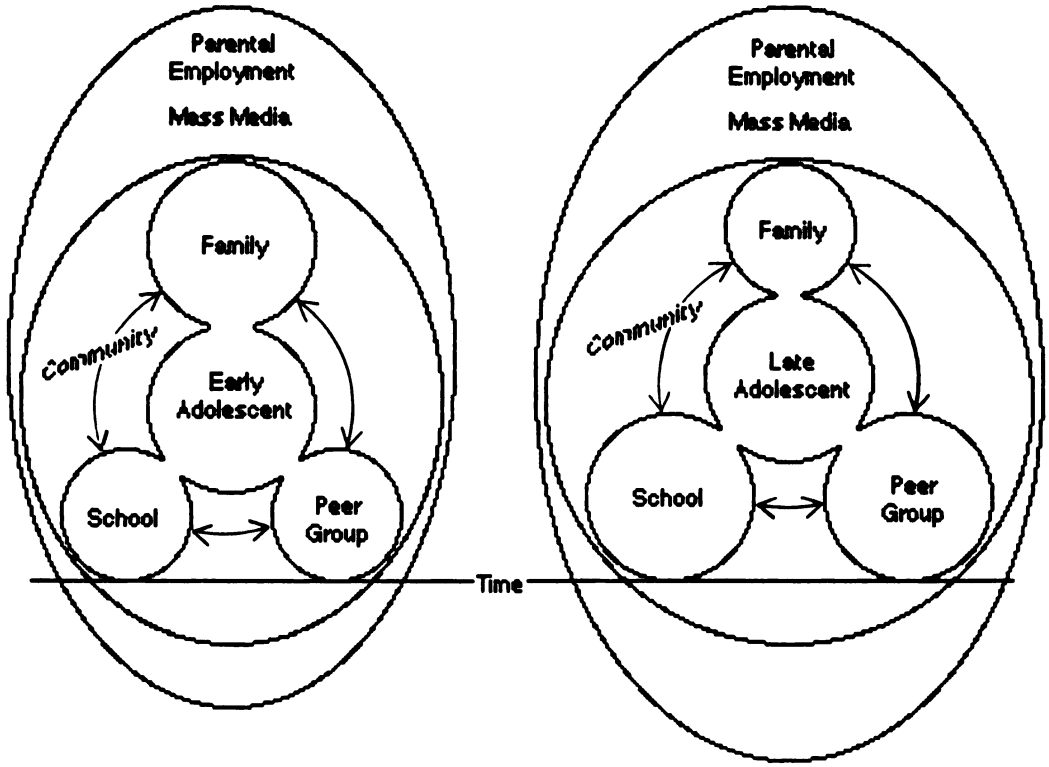

FIGURE 4: The Exosystem of Adolescent Career Development

The Macrosystem

The macrosystem is the broad cultural context that affects the variables identified at previous levels. The macrosystem includes such variables as social change, culture, belief systems, technological change, and the work ethic. Of these, social change, culture and technological change have been included in the model.

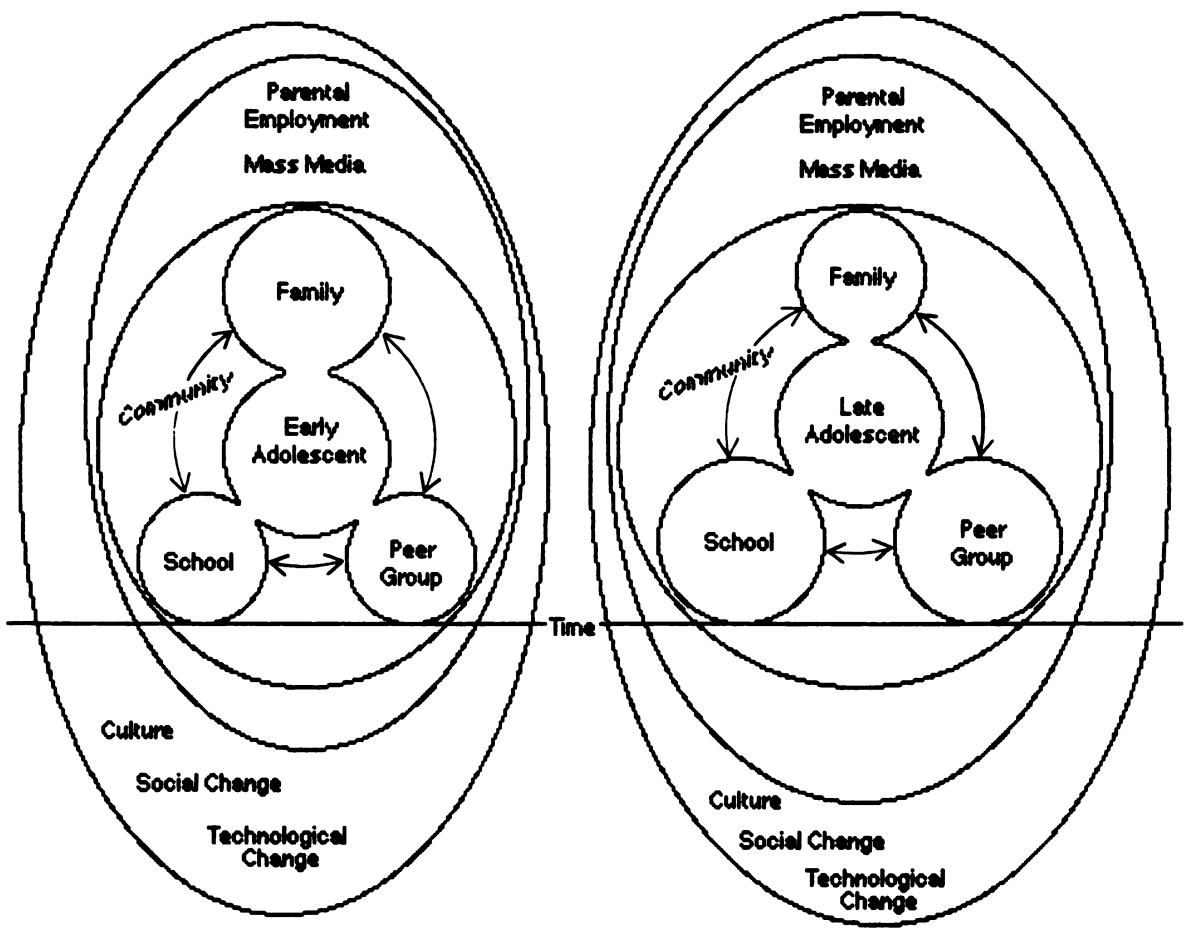

FIGURE 5: The Macrosystem of Adolescent Career Development

The Chronosystem

In 1986, Bronfenbrenner proposed the term "chronosystem" for designating a research model "that makes possible examining the influence on the person's development of changes (and continuities) over time in the environments in which the person is living" (Bronfenbrenner, 1986, p. 724). A chronosystem model, such as the one proposed for this study, takes into account changes over time within the person and in the environment, as well as enabling analysis of the relationship between the two. The simplest form of chronosystem focuses on a life transition. "Such transitions occur throughout the life span and often serve as a direct impetus for developmental change" (Bronfenbrenner, 1986, p. 724). The more complex form of chronosystem focuses on the cumulative effects of a sequence of developmental transition over an extended period of an individual's life. The latter model is the form of analysis used in this study for assessing the impact of changes in career interests from early to late adolescence across the environments of family, school and peer group.

The Development of Career Interests from Early to Late Adolescence: An Ecological Approach

From Hill's (1980) framework of early adolescence, career exploration is viewed within the developmental task of achievement, that is, the focusing of ambition into future-oriented and attainable goals. From Bronfenbrenner's (1979) ecological perspective, early adolescent development is the increasing ability of a youth to understand and act upon his or her environment. The most influential environments on the early adolescent are the primary settings, that is, the family, school and peer group. These settings "set in motion and sustain patterns of motivation and activity in the developing person that then acquire a momentum of their own" (Hamilton, 1982, p. 2). Super's theory of career development stressed the interaction of personal and environmental variables and delimited the stages of growth and exploration that take place during the transition from early to late adolescence as key periods in the developmental process. Following from the work of the aforementioned theorists, changes in career interests from early to late adolescence may be viewed across three types of environments:

1. direct contact environments, i.e., family, school, peer group.
2. indirect contact environments, i.e., parental employment.

3. societal environments, i.e., media, stereotypes and cultural values.

These environments represented parts of Bronfenbrenner's micro-, meso-, exo- and macro-system environmental concepts. The microsystem is a pattern of roles and relations experienced by the developing adolescent in a given setting with particular characteristics. An example of this would be the parent-child dyad. The mesosystem is the interrelationships among two or more settings in which the youth actively participates. This could be the relationships among home, school and peers. Thus, a mesosystem can be viewed as a system of microsystems. The exosystem are settings that do not directly involve the early or late adolescent, but can affect (or be affected by) things that happen in the setting containing the youth. For example, parental employment. Lastly, the macrosystem is the broad cultural context that affects the variables identified at previous levels and it includes such things as belief systems, technological change, social policy and the work ethic.

Hamilton applied Bronfenbrenner's approach to the problem of poorer school performance, on the average, of adolescents from low-income and minority families. According to Hamilton (1982), "The ecological perspective calls attention to the mutually reinforcing influences of the poor or minority adolescent's home, neighborhood, peer group, and school" (p. 2). In other words, the adolescent influences his or her environments as he or she is influenced by them, and the influence of any one setting operates in conjunction with the influence of the other settings.

Building on the earlier work of Hamilton & Crouter (1980), Young (1983) used Bronfenbrenner's ecological model of human development as a framework for examining research on adolescent career development. The stated purpose of Young's study was "to illustrate, by focusing specifically on career development research on adolescents and young adults, the way in which Bronfenbrenner's ecological model is useful in providing a framework for career development research" (p. 402). To this end, Young adapted Hamilton's definition of adolescent development to career development. Fusing the developmental and ecological perspectives together, he defined career development as the growing capacity of the person to understand and act on the career environment. The primary thesis of Young's study was that career

development of adolescents occurs in an ecological context. Variables at each level—microsystem, mesosystem, exosystem, and macrosystem—influence and are in turn influenced by the adolescent's career development. Young's finding that an ecological model "may be equally heuristic for career development research on other age levels or groups" supports the central thesis of this research.

The ecological approach described by Bronfenbrenner and adapted by Hamilton and Young recognized the need to go beyond the traditional life span perspective that looks primarily at parent-child dyads and create an ecosystem for study. Following from their earlier work, the study of changes in career preference from early to late adolescence involves analysis of the changes within the youth and across a variety of environments. These changes create an adaptive challenge specific to early adolescence. For adaptation to occur within the context of career development, the early adolescent must adjust his or her changing self to his or her changing world and pass through the vocational life stages of growth and exploration. As Ginzberg et al. and Super have stated, the transition from early adolescence to late adolescence is a crucial period in career development. To understand career development, one must understand the multiple, interrelated changes that occur during this period of human development. A life span, ecological perspective is designed to take into account these multiple, interrelated changes over time.

BASIC ASSUMPTIONS

The following assumptions underlie the life span, ecological perspective applied in this study.

1. Change is inevitable and occurs throughout an individual's life-span.
2. Development is an ongoing process of change.
3. Each individual is unique.
4. An individual's development is affected by his or her interaction with the environment and by events in settings in which he or she is not present.
5. Settings can change.
6. The influence of any one setting operates in conjunction with the influence of other settings.

DEFINITIONS

The following are definitions of the primary concepts contained in the research questions for this study:

Career

An occupation or profession.

Career Development

The growing capacity of the person to understand and act on the career environment.

Career Exploration

The active investigation and consideration of future-oriented job opportunities. Career exploration is directly related to the developmental task of achievement.

Career Interest

What type of work an early or late adolescent thinks he or she would like to do as an adult.

Early Adolescent

Human males and females between the ages of ten and fourteen.

Late Adolescent

Human males and females between the ages of fifteen and eighteen.

The following are definitions of the primary concepts contained in the conceptual framework for this study:

Achievement

In the context of this study, the focusing of ambition into future-oriented and attainable goals.

Development

The process of change, growth, advancement, evolution. From Bronfenbrenner's ecological perspective, early adolescent development is the increasing ability of a youth to understand and act upon his or her environment.

Developmental Task

A role expectation which arises in or about the life of an individual or group, such as the family. Successful achievement leads to success with later tasks or to integration of roles; failure of achievement leads to difficulty with later tasks and lack of integration of roles. Some tasks are considered critical for successful movement through the life cycle.

Environment

Whatever is external to and potentially or actually influential on an individual. A basic notion is that a change in the environment will affect the individual, and vice versa.

Occupation

For this study, a group of similar, paid positions found in different industries and organizations.

Setting

A place where individuals can readily interact. Three of the most influential environments on the early adolescent are the primary settings of the family, school and peer group.

CHAPTER 2
LITERATURE REVIEW

This chapter is divided into six major sections: (1) The Human Ecological Perspective; (2) Early Adolescence: A Stage of Human Development?; (3) Early Adolescence: A Life Span Ecological Approach; (4) Career Interests of Early Adolescents; (5) Careers for the Future; and (6) Gender Differences in Junior High. Review of the relevant literature in these areas provides the foundation upon which the research and analysis for this study are built.

THE HUMAN ECOLOGICAL PERSPECTIVE

A Brief History

Much has been said about what human ecology is or should be. The term "ecology" is derived from the Greek words "oikos," meaning house, and "logus," meaning knowledge. When coupled with the term "human," ecology can be interpreted as the study of the house or habitat of human beings. Most simply put, human ecology is the study of the relationship between human beings and nature (Visvader et al.). Just what is a human ecological perspective, however, is not so simply put. Human ecological thought has a long history that begins in the natural sciences and winds its way through all of the social sciences.

From a social science perspective, it is in sociology that the idea of human ecology first took hold, and where may be found "the strongest and most unbroken tradition" (Young, 1974, p.11). The beginning was 1921 with the book Introduction to the Science of Sociology by Robert Park and Ernest Burgess. This preceded by at least a year Harlan Barrows' presidential address to the Association of American Geographers. In that speech, he attempted to define geography as "the science of human ecology" (Barrows, 1923, p. 1). His idea was rejected, although there exists a rather erratic ecological tradition in geography to this day. A strong ecological approach is also present in anthropology, but it was not formally articulated until Julian Steward's 1955 book, Theory of Cultural Change. In 1935, psychologist Kurt Lewin adapted

some of the basic concepts of human ecology to psychology when he introduced the equation B=f(PE) (Lewin, 1935). This equation states that behavior is a function of the interaction between the person and the environment. Lewin called his approach psychological ecology. In 1954, Roger Barker and Herbert Wright pioneered what they called ecological psychology in a study of the children of the town of Midwest, Kansas (Barker & Wright, 1954). The latter term is the one preferred today, but the approach has been challenged. Developmental psychologist Urie Bronfenbrenner voiced his disagreement with Barker and Wright's approach in his 1979 book, The Ecology of Human Development. To Bronfenbrenner, human development is the increasing ability of a person to understand and act upon his or her environment. Unlike Barker and Wright, Bronfenbrenner advocates the study of individual interactions in many settings. Economics and political science have each developed a human ecological approach to varying degrees, but started much later than the other disciplines. The following outline presents a brief history of the human ecological perspective in the social sciences.

1859	Geoffrey Saint Hilaire	Used term ethology to refer to the study of relationships between the organism and the environment.
1870	Ernst Haekel	German biologist. Credited with first clear definition of ecology.
1882	Ellen Swallow Richards	Proposed creation of an area of study called Home Oekology. "The woman who founded ecology."
1899	Lake Placid Conference	Decided against oekology in favor of home economics.
1921	Robert Park & Ernest Burgess	Sociologists who popularized concept of human ecology. Conceived human ecology not as a branch of sociology but rather a perspective. They recognized its kinship to and derivation from geography and biology. Together they wrote Introduction to the Science of Sociology.
1924	Roderick McKenzie	First sociologist to present a definitive statement of human ecology.
	Park, Burgess, McKenzie	According to Young, the "founders" of human ecology. All were sociological human ecologists and all were associated with the University of Chicago.
1935	Kurt Lewin	Psychologist who introduced equation B=f(PE); behavior is a function of the interaction between the person and the environment.

	John William Bews	Human ecology always endeavors to view the environment—function—organism triad as one definitely, integrated whole. "The result is a habit of mind, a mode of thinking, and a general philosophy of life. Ecology is to be looked upon also as an art. Art makes life clearer, more vivid, more alive. Art intensifies and clarifies the whole of man's experience."
1950	Amos Hawley	Defined human ecology as the study of the form and development of the community in human population.
1961	George Theodorson	Wrote review of the literature. Identified social-cultural approach.
1963	Eugene Odum	Biologist. Saw ecology as a division of biology. "The concept of human ecology in the natural sciences is generally limited to the inter-relationship of humans with the physical environment." Defined ecology as "the study of the relation of organisms or groups of organisms to their environment."
1966	Kenneth Boulding	Economist. In a 1966 essay, he formalized five basic similarities between ecology and economics.
1970	Nancy Hook & Beatrice Paolucci	Proposed the study of the family as an ecosystem.
	William Michelson	Sociologist. Recognized that human ecology is a linkage of the social and physical sciences.
1973	Michael Micklin	Sociologist. Adaptation of and by the interacting components of population and environment determines the degree and kinds of ecological activity. "The ecosystem concept represents the most inclusive unit of analysis in modern ecology. The ecological perspective is designed to address questions about the behavior of organisms in an environmental context. A major difference between ecological systems of humans and other species is the role of culture in guiding adaptive responses in the former."
1974	Gerald Young	Human Ecology as an Interdisciplinary Concept: A Critical Inquiry published. "An ecological approach is well developed in the more 'social' of the social sciences: sociology and anthropology. Geography can trace a history, though erratic, almost back as far as sociology and, by some arguments, even further. Psychology began to develop such an approach in the 1940s with the past decade marking some major contributions. The history of the approach in economics is concurrent with the major work of one economist, Kenneth Boulding. Political science has a small nucleus

		of workers. Considered separately, there is little coherence in the adoption of the ecological approach in the social sciences, that is apart from sociology."
1979	Society for Human Ecology	Founded.
	Urie Bronfenbrenner	Developmental psychologist. Describes theory of the ecology of human development in book, The Ecology of Human Development.
	Margaret Bubolz, Joanne Eicher & M. Suzanne Sontag	Developed a human ecological model for research and study of human behavior.
1983	Gerald Young	The Origins of Human Ecology published.
1990	Bubolz & Sontag	"Human Ecology Theory" prepared for Sourcebook of Family Theories and Methods: A Contextual Approach.

Human Ecology and Home Economics

Human ecology is still a developing discipline. As a profession, it is concerned with applying academic knowledge to practical problems. Brown & Paolucci (1978) said that the persistent practical problems of individuals and families are the focus of home economics. Preparing our children for the careers of the future is an important practical problem from both a human ecological and home economics perspective. This is evident if one views the evolution of human ecology through home economics. In 1882, Ellen Swallow Richards first advocated using an ecological perspective for the study of "our normal lives." Richards proposed calling this area of study "home oekology," but her terminology did not win acceptance with her colleagues and at the 1899 Lake Placid Conference they decided to call their field home economics instead (Kilsdonk, 1980). Although the "oekology" did not take hold, the field never strayed far from its ecological roots. During the 1960s, the concept of human ecology once again became the unifying philosophical perspective for home economics (Sontag & Bubolz, 1986).

Human ecology can be defined as the study of human ecosystems. A human ecosystem can be viewed as the relations between and among individuals and families with their near environments. According to Bubolz et al. (1979), a human ecosystem involves the movement, transformation and storage of energy, matter and information through biological, physical and social processes. A home economics/ecological perspective views the home as a significant social and physical environment affecting human development. The focus on the home does

not exclude looking at complex societal problems since an ecological perspective speaks to the interactions between humans and all of their environments. According to Kilsdonk (1980), home oekology grew out of Richards' concern for applying scientific knowledge to the improvement of the home, which in turn would improve the family and society in general. How well the aspirations of today's youths match the reality of tomorrow's job market will have direct impact on their adult lives, the lives of their families and society in general. The issue of whether or not we as a society are preparing our children for the careers of the future, therefore, strikes to the philosophical heart of a home economics/ecological perspective. There are no easy answers, but an ecological perspective offers the most thorough and useful analysis of this problem.

EARLY ADOLESCENCE: A STAGE OF HUMAN DEVELOPMENT?

Often defined as the period between 10 and 14 years of age, early adolescence is a unique and critical time in human development. With the exception of infancy, early adolescence involves the most rapid physical growth experienced by humans (Brooks-Gunn, 1987; Kagan, 1972). During this period, the developing early adolescent is also experiencing great cognitive and social growth. This growth brings with it social, emotional and psychological changes. According to Brooks-Gunn (1987), the unique feature of early adolescence is that for the first time

> the young adolescent is able to reflect upon and, in some cases, to affect these changes; to integrate them into (his or) her self-identity; and to incorporate others' responses to (his or) her changing body and role status into that self-identity. (p. 124)

This uniqueness has led researchers such as Kagan to view early adolescence as a separate stage of human development. Kagan (1976) defined a developmental stage as "a special hierarchical organization of psychological processes that is part of an invariant sequence of theoretically related stages" (p. 119). Thornburg (1983) criticized Kagan's definition because it failed to account for social phenomena. According to Thornburg, the dynamics of development are generally characterized by looking at physical, cognitive and social growth in the individual. It follows that when major shifts in capacity for behavior occur, an individual is moving out of one stage and into another. Thornburg (1983) believed that early adolescence is "a transitional rather than a stable stage" of human development (p. 80). He also believed that it plays an important

role in the life span since it is the transitional phase between childhood and adolescence. Echoing Lipsitz's 1977 message, Thornburg called for more attention to theory and research on early adolescence.

The debate over whether or not early adolescence is a stable or transitional stage of development is beyond the scope of this research. Suffice it to say that for early adolescence to be considered a stage at all depends on the establishment of it as a period different from childhood and adolescence. That will be accomplished by looking at the following three areas of development: physical, cognitive and social growth.

Physical Growth

According to Nelson (1985), "The reason for conceptualizing early adolescence as a stage of development separate from childhood and adolescence is due in large part to the occurrence of puberty" (p. 18). Cohen & Frank (1975) defined puberty as the phase of bodily development during which the gonads secrete sex hormones in amounts sufficient to cause accelerated growth during which secondary sex characteristics appear. In fact, a wide variety of primary and secondary sexual characteristics develop for the first time during these years. Thus, for males and females, early adolescence is the time during which the individual's body undergoes the transformation from a child to an adult in stature and proportion. However, as Blyth & Traeger (1983) point out, there is enormous individual variability in when these changes take place and the rate at which they occur. "For the most part, these changes are poorly correlated with age and there can be huge differences between individuals in the degree of physical maturity at any point in time during this age range" (Blyth, et al., 1983, p. 92). In other words, puberty is not a single, sudden event, but a gradual process. According to Thornburg (1983), during the ages of 10 through 14, most early adolescents are in transitional growth, that is, "they have begun growth as measured by the Tanner classification system, but have not yet completed such maturation" (p. 81). Petersen (1987) argues that "such a transition period provides a window through which to observe developmental processes and influences on them" (p. 35). If we look through that window, the uniqueness of early adolescence as a stage of development comes into view.

Cognitive Growth

Not only are there dramatic physical changes in early adolescence, but significant cognitive changes take place as well. In The Growth of Logical Thinking from Childhood to Adolescence, Inhelder & Piaget (1958) described the stages of cognitive development. The four stages they identified are: (1) the sensorimotor period (birth to 2 years); (2) the preoperational period (2 to 7 years); (3) the concrete operational period (7 to 11 years); and (4) the formal operational period (11 to adulthood). Piaget & Inhelder (1969) attributed the emergence of formal operational thought during the ages of 11 to 14 to the interaction of pubertal and environmental changes that occur during this period of development. The kind of thinking characteristic of formal operational thought is termed "abstract." Abstract thinking enables an individual to consider the thoughts and perspectives of others. Piaget (1950) believed that formal operations, that is, the capacity to think abstractly, are initiated through co-operation with others. During early adolescence, a child's social life enters a new phase which involves an exchange of viewpoints and discussion of differing points of view. Piaget observed that "co-operation is an objectively conducted discussion. . . .It is clear that co-operation is the first of a series of forms of behavior which are important for the constitution and development of logic" (Piaget, 1969, p. 117).

Moving from concrete to formal operations has been shown to have implications for all aspects of the adolescent experience "from self-concept to ethical values to vocational development" (Garbarino, 1985, p.152). However, research by Hurtig (1981), Petersen (1987) and Youniss (1981) suggests that formal operational thought or abstract reasoning, although correlated with other aspects of development, is not essential for psychological growth and social development. Furthermore, Petersen, Tobin-Richards & Boxer (1983) have stated that the onset of adolescence does not necessarily mean that formal operational thought will occur. Thus, it may be argued that there are significant cognitive changes during early adolescence that set it apart from childhood and adolescence, but these changes affect some early adolescents more strongly than others.

Social Growth

Early adolescence is not simply a physical or cognitive process; there is more to it than sexual maturation and formal operational thought.

It is also a period of social growth. From a developmental standpoint, early adolescents become more socially curious and more active around age 10. Between the ages of 10 and 14, most children begin to spend less time with their parents and more time in school and other organized and unorganized activities outside the home. Their peers and friends begin to take up more of their time and parents begin to perceive that they have less influence on their child. The early adolescent is developing socially and their world is expanding. Thornburg, who has done extensive research in the area of early adolescent social development (see Thornburg, 1970, 1973, 1974, 1980, 1981, 1982; Thornburg & Gould, 1980), hypothesizes that "the first eight years of life are characterized by the stability of social learning, whereas the period of early adolescence is the time when individuals attempt to confirm or validate earlier social learnings" (Thornburg, 1983, p. 82). To validate what they have learned, early adolescents search out new environments. It is during this period that the youths move from the familiar and protective elementary school environment to a more challenging and complex secondary school environment. Research by Blyth et al. (1983), Blyth, Simmons & Bush (1978) and Simmons, Blyth, Cleave & Bush (1979) suggest that this transition into middle school and junior high school is an important and unique period in the social lives of early adolescents. The researchers also found that negative transitions can impact on later transitions into high school and adult life. What is implied is that during early adolescence, social growth, like physical and cognitive growth, is a transitional and important stage of human development.

Implications

The answer to the question of whether or not early adolescence is a stage of human development might seem a bit blurred by the preceding discussion. The evidence for an affirmative answer is there, but it becomes muddled when physical, cognitive and social growth are viewed as three separate areas of development. In reality, physical, cognitive and social changes do not occur independently. During the ages of 10 to 14, these changes are taking place simultaneously and changes in one area are affected by and affect changes in the other areas. Recent research on early adolescence by Lerner (1987), Petersen (1987), Simmons, Carlton-Ford and Blyth (1987) and Thornburg (1983) has attempted to integrate these multiple changes into a unifying framework.

From this emerging perspective of early adolescence, physical growth is seen as both influencing and being influenced by cognitive and social growth. Change during this period is also seen as occurring in every aspect of individual development and in every important social context (Petersen (1987). It is a time when multiple changes in multiple contexts takes place. Thus, early adolescence is a particularly appropriate time to study the relation between a changing person and his or her changing world (Lerner, 1987). This multiplicity of change has served to highlight the limitations of the life span approach to human development. Brim & Kagan (1980) state that "growth is more individualistic than was thought, and it is difficult to find general patterns" (p. 13). To see early adolescence as a stage of human development, a perspective is needed that acknowledges that individuals change over time and that these changes are influenced by and reciprocally influence the multiple environments in which they live. A life span, ecological approach to human development supplies such a view. From this perspective, interactions between early adolescents and the multiple environments within which they live can be studied. Such an approach will be discussed in the following section.

EARLY ADOLESCENCE: A LIFE SPAN ECOLOGICAL APPROACH

Traditional views of human development emphasize extreme change from birth to adolescence, stability in adulthood and decline in old age (Santrock, 1983). During the last three decades, many social scientists have changed their conception of human development and subsequently shifted the focus of their research. One view that has emerged, as summarized by Brim et al. (1980), "is that humans have a capacity for change across the entire life span" (p. 1). This view has been termed a life span perspective of human development. The life span view of human development sees development as a pattern of change that begins at conception and continues throughout the life-cycle (Baltes, 1979; Baltes, et al., 1984; Baltes, Reese & Lipsett, 1980). The major focus of the life span perspective is development over time: individual; family; chronological; and historical (Hill et al., 1979). Individuals grow, develop, and change over time. As they grow and develop, they move through a series of life-cycle stages, and each stage has its own characteristic tasks and patterns of interaction. However, in contemporary research on life

span development, there is no consensus as to what the exact stages of the life-cycle are and when they occur. As stated in the previous section, there is much evidence that early adolescence is a stage of development, but what exactly the evidence means is still being debated.

Another emerging view of human development is the ecological approach. This perspective applies the insights of many disciplines to understanding the multiple influences on human development. In his 1979 work The Ecology of Human Development, Bronfenbrenner conceptualized a framework for the application of the ecological approach to human development. According to his framework, to understand how adolescents influence their own development, we need to conceptualize the context wherein significant interactions occur for the adolescent, as well as to conceptualize the nature of the individual. In terms of human development, such a framework has been applied by Hamilton (1982) to adolescent development and schooling, Young (1983) to adolescent career development and Nelson (1985) to early adolescent sex role development.

In applying Bronfenbrenner's ecological approach to the poorer school performance, on average, of adolescents from low-income and minority families, Hamilton (1982) found that schools by themselves are not powerful enough to overcome "the interactive influences of the primary settings on the developmental trajectories of disadvantaged adolescents" (p. 5). The primary settings, as defined by Bronfenbrenner, are the most powerful environmental influences on human development. For the poor or minority adolescent, the mutually reinforcing settings that are most powerful are the home, neighborhood, peer group and school. According to Bronfenbrenner (1979), these settings "set in motion and sustain patterns of motivation and activity" in the developing adolescent that then acquire a momentum of their own (p. 284-285). These sustained patterns of motivation and activity are the developmental trajectories. Hamilton states that "the initial influence of the family guides the lower-class child into peer groups that reinforce a set of attitudes and behaviors that conflict with the demands of the school" (p. 3). The best way to improve school performance of poor and minority adolescents, according to an applied ecological approach, would be to open the schools to interaction among the settings in which the adolescents develop. The goal would be to increase the interactions of the

adolescents with people who are different from themselves, thereby increasing their opportunities and eventually reducing social and economic inequality.

Young (1983) used Bronfenbrenner's ecological model of human development as a framework for examining the research on the career development of adolescents. The primary thesis of his study was that the career development of adolescents occurs in an ecological context. What Young found in a review of the relevant literature was that the individual or ontogenic approach predominates. This approach, he argued, has led researchers away from developmental models which incorporate the individual as well as environmental variables. To illustrate more fully the context in which development occurs, Young looked at the research across Bronfenbrenner's four contexts—the microsystem, the mesosystem, the exosystem and the macrosystem. He concluded that the amount of developmentally based research was limited for the microsystem and almost nonexistent for the other systems. To elucidate the context in which adolescent career development occurs, Young called for the application of an ecological perspective.

Nelson (1985) applied Bronfenbrenner's ecological approach to the development of early adolescent male and female sex role attitudes and behaviors. In her study, Nelson examined the relationship between selected exosystem, microsystem and human system variables and sex role attitudes and behaviors. The purpose of her research was twofold: (1) to develop models for early adolescent male and female sex role development using an ecological approach; and (2) to test sections of Bronfenbrenner's theoretical framework. Two significant models regarding sex role development were found, but more important to this research were her conclusions regarding Bronfenbrenner's theoretical framework. According to Nelson, her study "points out that one of the major considerations of a researcher who would like to apply Bronfenbrenner's theory is the inclusion of human variables" (p. 110). Human variables were defined as the child's chronological age and the child's pubertal age as assessed by his or her parents. Nelson also found that "Bronfenbrenner's conceptualization of the environments is a useful and necessary one" (p.110). In her conclusion, Nelson states that early adolescence needs to be studied in its own right and she advocates a life span, ecological approach for conducting such research.

Integration and Application

Recently, integration of the life span and ecological perspectives of human development has come into acceptance. Keith et al. (1983), Keith, Hoopfer & Nelson (1987) and Lerner (1987) have integrated the two perspectives and applied the hybrid to early adolescent development. Such an approach is advocated by these social scientists because a life span ecological approach to human development takes into account the uniqueness of the individual, the capacity for an individual to change over time and the influences of multiple environments on the individual and vice versa. It is also believed by these researchers that the integration of the two perspectives has the potential to more fully describe human development, particularly early adolescence, than any other singular approach.

Keith et al. (1983) applied a life span ecological approach to a statewide study of early adolescents in Michigan in 1983. Saying that it is obvious that early adolescence is a "separate time" marked by physical, cognitive and social changes in the adolescent, the study adapted the primary developmental tasks of early adolescence identified by Hill (1980) to Bronfenbrenner's (1979) schema of microsystem, mesosystem, exosystem and macrosystem environments. The purpose of their approach was to create an ecosystem for study as defined by Bubolz et al. (1979) and Hook & Paolucci (1970). Information about four of the developmental tasks (attachment, autonomy, achievement and identity) was gathered and analyzed in relation to information about each child, his or her family and outside of school time. Parents provided information on their attitudes toward early adolescents, family relationships and help needed with building skills of early adolescents. Out-of-school activities, after-school care, youth club participation and television viewing also were examined. The findings from the survey presented profiles of Michigan early adolescents and their families, as well as identified how the youths use their out-of-school time and how they would like to use it.

Keith et al. (1987) repeated the survey four years later. It included a new sample of early adolescents as well as participants from the 1983 study. The researchers' major objectives were to: (1) develop a profile of early adolescents; (2) develop a profile of families which include early adolescents; and (3) identify how 10-to-14 year olds use their out-of-

school time and how they would like to use it. Interest in how youths' lives change over time prompted the inclusion of re-interviews of participants from the first survey, now between 14 and 18 years of age, and their parents. The purpose, however, remained the same: to provide useful information about early adolescence to the youths, their parents and the adults who work with them through the application of a life span ecological approach. This information presently is being analyzed.

Lerner (1987), building upon the work of Hamburg (1974), argues that early adolescence is a unique time in human development and should be studied as such. To this end, he advocates a life span perspective and offers "a general model of bidirectional adolescent-context relations" that is "descriptive of the relations that theorists (e.g. Bronfenbrenner, 1979;. . .) have noted" (p.19). Basically, he is advocating the life span ecological approach to the study of early adolescence. Lerner summarizes his conceptualization of early adolescent development as follows:

1. Developmental change is potentially a life span phenomena.
2. Such change involves a contextual view of the person, that is, that the person is reciprocally embedded in his or her world.
3. Such change therefore involves adaptations of changing people to their own development.
4. Adolescence, and particularly early adolescence, involves dramatic changes within the person, in the person's social context, and in the relation between the person and the context.
5. Not only is this period a key time within which to focus research in order to substantiate this developmental contextual view of development, but conversely, in order to understand early adolescence one must appreciate the multiple, interrelated intraindividual and interpersonal changes involved in development at this time of life. (p. 28)

Lerner has approached human development from a developmental-contextual perspective similar to the life span ecological approach previously described in this study, but he eschews much of the systems terminology found in Bronfenbrenner and the related literature. Nevertheless, Lerner has focused on the early adolescent as a "whole" person in the multiple contexts that influence and are influenced by the adolescent's development.

Implications

Early adolescence is a unique period of human development that is marked by major physical, cognitive and social change. It is also a unique time to study the relation between a changing person and his or her changing world because of the volume of change. Thus, it is a particularly appropriate time to employ a life span ecological perspective. Such a perspective offers a dynamic way in which to view a period of great dynamism.

CAREER INTERESTS OF EARLY ADOLESCENTS

What Is a Career?

Perhaps the most frequently cited definition of career is the following put forth by Super (1976):

> The course of events which constitutes a life; the sequence of occupations and other life roles which combine to express one's commitment to work in his or her total pattern of self-development; the series of remunerated and nonremunerated positions occupied by a person from adolescence through retirement, of which occupation is only one; includes work-related roles such as those of student, employee, and pensioner together with complementary avocational, familial and civic roles. Careers exist only as people pursue them; they are person-centered. (p. 4)

Careers are unique to an individual. They are dynamic and changing throughout the life span. Most important in terms of early adolescence, careers are created by what a person chooses or does not choose (Herr, et al., 1979). Thus, the career interests voiced by early adolescents today will have an impact on their future career development. It is this last notion of careers, "they exist only as people pursue them," which summarizes the importance of career exploration to this developmental process.

The Importance of Career Exploration

Career exploration is the process of gathering and evaluating career related information (Greenhaus, Hawkins & Brenner, 1983). Careers are unique to each person and created by what one chooses or does not choose throughout the life span (Herr & Cramer, 1988). Although career exploration can take place across a wide range of ages, it may be particularly important during early adolescence (Ginzberg, et al., 1951; Super, et al., 1978). A major purpose of this study is to determine if the career interests of early adolescents are good predictors

of late adolescent career interests. The goal is to explore the development of career interests during adolescence in terms of the skills that the youths will need to attain their career objectives in later life. A survey of the relevant literature in the area of early adolescent career exploration uncovered one article devoted to this topic. The article "Career Preferences of Early Adolescents: Age and Sex Differences" by Erb (1983) presents the findings of a study designed to examine age and sex differences among early adolescents on preference for eight career areas. There is no attempt to tie Erb's study to any theoretical base. Instead, the author's stated intention is to build on his own previous study of early adolescent attitudes toward science and science careers (see Erb, 1981). The author does, however, suggest that educators need a better understanding of developing career preferences among early adolescents. The suggestion that the career interests of early adolescents need more attention and study came to the fore in the 1978 "Early Adolescence: Perspectives and Recommendations to the National Science Foundation (1978)." The report makes a strong argument for the need for early adolescent career education. According to the un-named authors, "Career exploration in early adolescent science, mathematics, and social science instruction is imperative if more youth are to be encouraged to consider careers in these areas" (p. 169). The authors cite the lack of research in this area as evidence that the needs of early adolescents in relation to career education and exploration are not being met. For whatever reason, there has been a lack of concentration in psychological, sociological, educational and/or occupational journals on early adolescent career exploration. The need for such research has been noted by the NSF, Erb (1983), Keith et al. (1983) and Keith et al. (1987). There is also support for such research in the theoretical perspectives of career development.

Theories of Career Development

In the 1950s, theorists began to emphasize a developmental view of occupational choice and it was during this time period that the term "vocational development" became popular (Bhaerman, Drier, Goldstein, Gybers & McDaniels, 1986). As knowledge about vocational and human development increased in the 1960s, the term "career development" took hold among researchers and theorists, and it is this term that is preferred today. Even with these changes in terminology, the majority of theorists in

the area of careers have dealt with occupational choice rather than with career development (Super, 1980). Whereas career development focuses upon the emergence of sequences of choices throughout the whole or part of the life span, occupational choice uses preferences to predict choices rather than sequences of occupational positions. In this regard, the work of Ginzberg (1972), Ginzberg et al. (1951), Super (1953) and Super et al. (1957) form the major theoretical underpinnings of career development for this study. Both were discussed in the previous chapter. Figure 6 offers a brief overview of these two theories.

	Fantasy stage (birth to 11)
Ginzberg et al.	Tentative stage (ages 11-17)
	Realistic stage (ages 17+)
	Growth (birth-14)
	Exploration (ages 15-24)
Super	Establishment (ages 25-44)
	Maintenance (ages 45-64)
	Decline (65-death)

FIGURE 6: Two Theories of Career Development

Super's (1980) life-span, life-space approach to career development offered the first framework for studying the individual in relation to his or her environment within a temporal framework. Although Super included an environmental component, he acknowledged that such variables have not been sufficiently investigated in the career development literature. A couple of years later, Vondracek et al. (1982) voiced the following view of the weaknesses in career development research:

> Although the current research literature on vocational development reflects a growing emphasis on a developmental perspective, there are still major shortcomings in the implementation of these orientations. These shortcomings involve problems of research design as well as problems of conceptualization—that is, a commitment to a life span developmental perspective cannot be the best actualized in our view, through reliance on personalogical, organismic conceptions of vocational-role development. Instead, an appreciation of

> mutually adaptive interchanges between adolescents and their contexts must be attained. (p. 609)

According to Young (1983), "Part of the problem has been that researchers and theoreticians have not had truly developmental models in which they were able to incorporate individual as well as environmental variables" (p. 402). In 1979, Bronfenbrenner provided an ecological model that permitted human development to be understood in terms of four embedded contexts. In 1983, Young applied Bronfenbrenner's ecological model to adolescent career development research to demonstrate the usefulness of such an approach. Three years later, Vondracek et al. (1986) said that the adaptation of Bronfenbrenner's framework to career development was "promising." This study attempts to go a few steps further by applying an ecological approach to the specific issue of changes in career interests from early to late adolescence.

CAREERS FOR THE FUTURE

The authors of books and articles on career opportunities for the future can be sorted into two categories, pessimists and optimists. The pessimists contend that a severe economic downturn—some say depression— by 1990 will bring about dramatic changes in the workforce by the year 2000 (Borchard, 1984; Cetron, 1984; Cetron & Davies, 1988). This theory is summed up by economist Lester Thurow, who has said "At the rate we're going, we are all going to end up working for the Japanese" (Makin, 1989, p. 147). There is much disagreement among economic forecasters as to what the future holds, but the consensus is leaning away from pessimism. The optimists see changes in career and job opportunities as tied to economic growth (1987; 1988; 1989; Austin, 1986; Baxter, 1986; Cornish, 1988; Cotter & Dorfman, 1981a; Cotter & Dorfman, 1981b; Dumaine, 1989; Easterlin & Crimmins, 1988; Kiplinger, 1987; Kutscher, 1988; Makin, 1989; Manning, 1989; Silvestri & Lukasiewicz, 1987; White, 1988; Whitman, 1989; Wolkomir, 1985). Technological breakthroughs will make the 1990s a decade of strong economic growth and opportunity that will change the way we live and work (Kiplinger, 1987). The U.S. Department of Labor's Division of Occupational Outlook is just as optimistic about future employment trends, but is less extreme in its view of changes in the labor force. U.S. Department of Labor statistics indicate that some of the fastest-growing job and career opportunities in

the 1990s will be in the areas of nursing, teaching, law, accounting, bookkeeping, banking and financial services, personnel and public relations (1987; 1988; 1988; 1989; Austin, 1986; Baxter, 1986; White, 1988). Table 1 shows U.S. Department of Labor predictions for selected occupations to the year 2000.

TABLE 1: Occupations with the Largest Number of New Jobs 1986-2000

Salesclerks	1.2 million
Waiters, waitresses	752,100
Registered nurses	612,000
Janitors, cleaners, maids	604,000
General managers and top executives	582,000
Cashiers	575,000
Truckdrivers	525,000
General office clerks	462,000
Food-counter workers	449,000
Nursing aides, orderlies, attendants	443,000

The high-school graduating class of the year 2000 is already in school. As leaders in business and industry in a recent edition of Fortune magazine stated, America's most valuable resource—its children—starts developing at an early age. How well they are prepared for the jobs and careers of the future depends on the schools of today. Are we preparing our children for the careers of the future? In an age of rapid advance, careers are likely to change as frequently as the technology on which they are based (Wolkomir, 1985). The class of 2000 will need a far better education simply to get a decent job (Cetron, 1988). During the next decade, virtually every job in the country will require some skill with information-processing technology, such as computers. "The secretary who once pecked away at a typewriter must now master a word processor, a computer and telecommunications equipment" (Whitman, 1989, p. 46). The transformation of old jobs into higher-tech versions will affect all areas of the service sector. Service jobs are predicted to form

nearly 90% of the economy by the year 2000 (1988; 1989; Cetron, 1988). If the service sector expands over the next decade as much as some experts predict, the need for a skilled labor force will expand proportionally (Whitman, 1989). Qualifications for today's middle and low-wage jobs are rising rapidly and will continue to rise through the 1990s (Kiplinger, 1987). "Even in mundane jobs, workers must be ever more literate" (Whitman, 1989, p. 46). Table 2 shows the average time spent reading per day for various service sector employment.

TABLE 2: Average Time Spent Reading Per Day for the Job

Occupation	Avg. Time Reading Per Day	Type of Material
Secretary	168 min.	reference books, lists, letters, handbooks
Account clerk	120 min.	correspondence, ledgers, lists, tables
Electrician	120 min.	technical references, blueprints, schematics
Practical nurse	78 min.	charts, tables, card files, reference books
Auto mechanic	60 min.	technical references, memos, work orders
Air conditioning mechanic	45 min.	manuals, blueprints, memos

Basic data: International Reading Association

Many service jobs are traditionally low paying, low skilled occupations, not careers to which one aspires. However, not all service sector jobs fall into this category. Accountants, attorneys, teachers, etc. are all service jobs. As technology continues to change the way we live and work, new service jobs that pay high salaries and require a high degree of skill are predicted to be created (Cetron, 1984). By the year 2000, the corps of technicians necessary to keep a highly automated

society running by installing and repairing office equipment, computers, factory robots and the like is expected to grow by 232,000 jobs (Silvestri, et al., 1987). Workers who do not possess the basic reading, writing and arithmetic skills as well as the necessary training for the more high-tech jobs will be stymied in their attempts to enter the workforce of the future (Cetron, 1988; Cetron, et al., 1988; Dumaine, 1989; Whitman, 1989). Failure to train the students of today for the jobs of tomorrow could produce a skills gap that could "block attempts during the next decade to raise sluggish U.S. productivity, forcing employers and taxpayers to retrain our own workers at huge expense" (Whitman, 1989, p.46).

The U.S. economy is headed toward service. According to Labor Department projections, the three jobs of the future with the most new jobs in absolute terms will be retail salespeople, waiters and waitresses, and registered nurses. Unlike in the past, these jobs as well as other mid and low-wage service jobs will require skilled workers who can read, reason, perform basic mathematics and deal well with people. For those who aspire to high wage, prestige careers, more advanced skills will be required. The children who make-up the class of 2000 will be exposed to more information and knowledge than their grandparents experienced in a lifetime. Only about 15% of the jobs by the year 2000 will require a college education according to Cetron (1988), but nearly all will require job specific training after high school.

GENDER DIFFERENCES IN JUNIOR HIGH

Junior high school students are not the children who inhabited elementary school a year or two earlier. As a result of their growth and experience, their horizons have widened. With puberty approaching for themselves or their peers, their perceptions of the world have changed (Herr & Cramer, 1988). Gender differences toward or away from particular career choices become major factors during this time period. Kammer (1985) reported that boys and girls differ in their occupational choices according to traditional sex-role expectations as early as eighth grade. Crites (1978) reported that longitudinal research indicated that sex differences do emerge above the seventh grade. Haring & Byard-Tyler (1984) agree that these differences occur and suggest the following four factors keep females from pursuing nontraditional occupations:

(1) sex—role socialization; (2) low self-efficacy; (3) negative attitudes held by females and their peers; and (4) career counselor bias.

Research on science and mathematics education in particular has found an apparent turn off of early adolescents to interest in science careers, especially among girls (Fennema, 1977; Fox, 1977; Pedro, Wolleat & Fennema, 1980). Erb's study of the career preferences of early adolescents found that girls showed increasing interest in traditional areas such as service and organization, whereas boys showed a stronger interest in traditional male careers in science and technology. Research also indicates that the career interests of males and females at the junior high school level and above are not the same for blacks or whites (Omvig & Thomas, 1974; Nafziger, Holland, Helms & McPartland, 1974).

Although it is not clear why these gender differences occur, it is important to recognize them in any study of youths during early adolescence. Although social reinforcement for working women is increasing and legislation bars overt obstacles, psychological barriers still tend to cause girls to have fewer career choices than boys (Herr & Cramer, 1988).

CHAPTER 3
RESEARCH METHODS

RESEARCH DESIGN

Following from the research questions that were stated earlier, the research has been designed to (1) describe the career interests of early and late adolescents in relation to expert projections of careers of the future; (2) explore the influence of early adolescent career interests and other selected variables on the formation of late adolescent career interests; (3) explore the influence of early adolescent career interests and other selected variables on late adolescent career exploration; and (4) explore the influence of late adolescent career exploration and other selected variables on late adolescent interest in careers for the future. Research for this study was gathered from the 1983 Michigan Early Adolescent Survey (MEAS I) and 1987 Michigan Early Adolescent Survey (MEAS II). Figure 7 illustrates the overall research design. It follows the theoretical framework set out by Bronfenbrenner (1979, 1986).

Variables

Microsystem	Mesosystem	Exosystem	Macrosystem	Chrono-system	Human System
Setting Family School Peer Group Interaction Parent-Child Relative-Child Teacher-Child Friend-Child	Context Community Interrelations Family School Peer Group	Context Parental Employment Mass Media	Culture Traditional Male Careers Traditional Female Careers Social Change Change to Service Careers Technological Change Change from Low Tech to High Tech Careers	Effects of develop-mental transition from early to late adolescence on changes in career interests Chronological age	Gender
Late Adolescent Career Interests Late Adolescent Career Exploration Late Adolescent Interest in Careers for the Future					

FIGURE 7: Overview of the Research Design

SAMPLE DESIGN

1983 Michigan Early Adolescent Survey (MEAS I)

The sample design for the MEAS I was a cross-sectional survey of 304 Michigan early adolescents and their parents. Interviews of early adolescent participants took place in the family's home. Trained interviewers queried the early adolescents while parents completed questionnaires in another room. The process took about an hour.

Volunteer interviewers were recruited in the twenty participating counties by 4-H county program leaders and program assistants. The interviewers were trained in an intensive ten-hour, two-day session. The session took place in February, 1983.

> Training consisted of sensitizing the interviewers to early adolescents,familiarizing them with the interview schedule, a presentation on nonverbal cues, guidelines on the interview process, critiquing videotaped interviews and group interviewing practice with an early adolescent. (Nelson, 1985, p. 48)

Upon completion of the interviewer training, introductory letters explaining the survey were sent to each potential family. Interviewers then made telephone contact to ascertain family interest and set up appointments for the interviews. All interviews were completed by September, 1983.

Sample Selection

The population for the MEAS I was Michigan early adolescents in grades five through eight who lived with either one or two parents and were on 1982 official state enrollment lists for public and private schools. Children in group homes, institutions or boarding schools were not included in this population.

The sampling procedure used was a stratified multi-stage cluster sample. The sample was selected using an equal probability of selection method (EPSEM). Although this method is one in which every member of the population has the same probability of being selected, even carefully selected EPSEM samples are seldom, if ever, perfectly representative of the populations from which they are drawn and, therefore, not generalizable to the entire population (Babbie, 1983). Because of substitutions made during the sampling process and self-selection by participants, this study is not generalizable to the entire population of Michigan early adolescents who live with either one or two parents. However, based upon comparisons of the sample with Michigan census data, Nelson (1985) found that the sample was generalizable to early adolescents and their families, in Michigan, in families where the parents are somewhat older and more educated.

County Selection

Based upon an administrative decision to conduct 300 interviews, Michigan counties were selected according to a stratification method. Population size was chosen as the stratifier. The three strata identified for the study were: (1) highly urban; (2) large cities and rural areas; and (3) highly rural. According to Nelson (1985), "It is important to note that income and urbanicity are highly correlated, so that for the most part, these strata also reflected income stratifications" (p. 50).

The following steps were taken to select the counties and assign the clusters:

1. Each county's population of 10-14 year olds was assigned random numbers based on its population.

2. Eighteen counties were selected randomly (1 cluster = 12 early adolescents).
3. To accurately represent the proportion of early adolescents in each county, 8 clusters of early adolescents were assigned to stratum 1; 9 to stratum 2; and 8 to stratum 3 (total sample = 300).

Table 3 further illustrates the selection of counties and assignment of clusters.

TABLE 3: County Selection and Cluster Assignments for MEAS I

Initial Selection		Remarks	Final Participants	
Allegan	1		Allegan	1
Benzie	1		Benzie	1
Calhoun	1		Calhoun	1
Chippewa	1	Declined to be part of the study; cluster given to Marquette based upon geographic similarity; demographically less alike than other substitutions, thereby, responsible for greatest amount of sampling bias in the sample		
Delta	1		Delta	1
Eaton	1		Eaton	1
Emmett	1	Declined to be part of the study; cluster given to Presque Isle based upon geographic and demographic similarities		
Kalamazoo	1		Kalamazoo	1
Kent	1		Kent	1
Lenawee	1		Lenawee	1
Macomb	1		Macomb	2
Oakland	3	Unable to interview the number of early adolescents required; one cluster given to Macomb based upon demographic similarities	Oakland	2
Saginaw	2		Saginaw	2
St. Clair	1		St. Clair	1
Tuscola	1		Tuscola	1
Van Buren	1		Van Buren	1
Washtenaw	1	Declined to be part of the study; cluster given to Ingham based upon geographic and demographic similarities		
Wayne	5	Unable to interview the number of early adolescents required; two clusters given to Genessee and one cluster given to Jackson based upon geographic and population similarities	Wayne	2
			Genessee	2
			Ingham	1
			Jackson	1
			Marquette	1
			Presque Isle	1
Totals # of clusters	**25**		**Total # of clusters**	**25**

School District Selection

Using the same selection procedure as in the counties, two school districts per county were chosen. Random numbers were assigned to all public and private school districts in the selected counties based upon their population. School districts could not provide numbers of ten to fourteen year olds in their districts, therefore, the districts were assigned random numbers based upon their total population. "If a district had a disproportionately larger or smaller amount of early adolescents compared to their total population, the sample is biased to that extent" (Nelson, 1985, p. 52). In fourteen of the twenty counties, county staff members received permission to gather student names from the first two randomly selected school districts chosen. Substitutions had to be made in the other six counties. In four out of the six, permission was received from the next school district randomly selected. County staff members in Oakland had to contact four school districts before receiving permission to sample in one of them. In Jackson, the Jackson Public Schools refused to supply student names and the sample was selected from the Catholic inner city schools instead. "This opened up the possibility for both racial and religious differences in the Jackson county sample" (Nelson, 1985, p. 53).

Student Selection

Students were selected by the following two methods to insure that an equal number of students in grades five, six, seven and eight, as well as an equal number of males and females, were chosen:

1. Lists of fifth, sixth, seventh and eighth graders were supplied by the school districts. The student lists for each grade were numbered and four names for each intended interview position were chosen, using a table of random numbers. School districts with one or two elementary schools and one middle school usually followed this procedure.

2. Schools were assigned random numbers based upon their population of ten to fourteen year olds. Two schools were picked for each school district. Students were assigned random numbers and four names for each intended interview position were chosen, using a table of random numbers. Large school districts usually followed this procedure.

Following the selection process, interviewers contacted the students' families until one consented to participate. According to Nelson (1985),

> Slightly over two times the number of families needed were called in order to fill each interview position. The amount differed greatly county to county. In general, it was more difficult to fill interview positions in the inner city situations and when the potential respondent was a fourteen year old male. (p. 54)

Weighting the Sample

Not all of the counties completed the number of interviews assigned to them. To compensate for this and to make sure that all strata were proportionally represented, the cases were weighed. Table 4 shows the percentage of incomplete interviews and the assigned weights per stratum.

TABLE 4: Weighting the Sample

Stratum	% of Incomplete Interviews	Weights
1	13.5	1.156627
2	4.5	1.046729
3	1.1	1.010526

Sample Description

Table 5 presents an overview of the gender, chronological age and grade of the early adolescents who participated in the MEAS I.

TABLE 5: Percentages of Early Adolescents in the MEAS I Based on Gender, Chronological Age, and Grade

Gender		Chronological Age		Grade	
Male	49.8%	10	13.0%		
		11	22.6	5	28.0%
		12	24.5	6	23.1
		13	25.2	7	24.2
		14	14.6	8	24.7
Female	50.2%	10	11.2%		
		11	22.9	5	23.6%
		12	28.9	6	22.1
		13	25.3	7	26.6
		14	11.8	8	27.7

Tables 6, 7 and 8 present an overview of the type of employment, occupation and education of the parents who participated in the MEAS I.

TABLE 6: MEAS I: Parents' Type of Employment

Father	Type of Employment	Mother
18.0%	Self-employed	10.2%
72.1	Employed by someone else	51.8
1.5	Full time in home	27.7
5.4	Unemployed	8.4
1.4	Retired	0.0
1.6	Student	1.9

TABLE 7: MEAS I: Parents' Occupations

Father	Occupation	Mother
48.0%	Trained technician or craftsperson	6.5%
5.4	Farm management, farmer	1.4
4.0	Service	18.4
14.8	Business executive, owner	3.3
2.0	Community or government	4.1
1.1	Secretary, clerical	21.1
21.1	Professional	13.1
1.0	Homemaker	31.7

TABLE 8: MEAS I: Parents' Level of Education

Father	Level of Education	Mother
6.0%	8th grade or less	4.3%
7.0	Some high school	8.9
26.4	High school graduate	37.4
30.1	Some college	28.7
14.3	College graduate	11.8
16.1	Graduate or professional school	8.8

Table 9 presents a profile of the families that participated in the MEAS I.

TABLE 9: Profile of Families from the MEAS I

Family Type	%	Place of Residence	%	Family Income	%
Two parents	82.0	Farm/Rural area	37.8	Less than $10,000	13.6
Single mother	16.0	Small town	16.3	$10,001-20,000	19.9
Single father	2.0	Town	13.4	$20,001-30,000	29.0
		Small city	13.1	$30,001-55,000	32.8
		Suburbs	8.5	$55,001-75,000	3.4
		Large city	10.9	More than $75,000	1.3

1987 Michigan Early Adolescent Survey (MEAS II)

The MEAS II included a panel study of participants from the MEAS I as well as a cohort study of early adolescents. It employed the same general purposes and procedures as the previous survey. As before, volunteer interviewers were recruited in the participating counties by 4-H county program leaders and program assistants. The interviewers were trained in intensive one-day sessions. The sessions took place on March 7, 1987 at Roseville, March 14 at East Lansing, April 2 at Gaylord, and April 3 at Escanaba. Training again consisted of sensitizing the interviewers to early adolescents, familiarizing them with the interview schedule, a presentation on nonverbal cues, guidelines on the interview process, critiquing videotaped interviews and group interviewing practice. At the end of the training period, introductory letters explaining the survey were sent to each potential family. Interviewers then made telephone contact with each potential family to determine interest in participation and set up interview appointments. All of the interviews were completed by August, 1988.

Panel Study Sample Selection

For the panel study, contact with 285 families from the 1983 survey was attempted. Letters were sent to this group seeking cooperation with the new survey. Of these 285 families, 140 (49 percent) could not be contacted. Of the remaining 145 families, 83 (57 percent) agreed to participate; 67 families consented to and were

interviewed in their homes and 16 more agreed to and completed the questionnaires through the mail. Sixty-two families (43 percent) declined to participate in the study. Table 10 presents an overview of panel study participants by county.

TABLE 10: Panel Study Participants by County

County	Completed interview in-home	Completed mail question-naire	Declined interview
Allegan	3	0	3
Benzie	5	0	0
Calhoun	0	3	0
Delta	4	0	6
Eaton	0	0	3
Genessee	3	0	7
Ingham	4	2	3
Jackson	0	0	2
Kalamazoo	1	0	2
Kent	5	0	1
Lenawee	0	0	0
Macomb	2	2	10
Marquette	5	1	6
Oakland	8	3	7
Presque Isle	7	0	2
Saginaw	11	3	3
St. Clair	0	2	0
Tuscola	4	0	5
Van Buren	5	0	2
Wayne	0	0	0
Totals	67	16	62

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Panel Study Description

Eighty-three families participated in the panel study. The study included 83 youths—43 girls and 40 boys. Nineteen percent were ninth graders, 30 percent were tenth graders, 28 percent were eleventh graders and 23 percent were twelfth graders. Table 11 presents an overview of the age and gender of the youths who participated in the panel study.

TABLE 11: Age and Gender Distribution for 1983 and 1987

Male	Age—1983	Female
7	10	5
9	11	7
13	12	13
7	13	12
4	14	6
40	Totals	43

Male	Age—1987	Female
4	14	3
11	15	9
12	16	11
9	17	12
4	18	8
40	Totals	43

In 1983, 147 parents completed questionnaires—79 mothers and 68 fathers. In 1987, 133 parents completed questionnaires—77 mothers and 56 fathers. Table 12 presents an overview of the age and level of education of the parents who participated in the panel study.

TABLE 12: Description of Parents Participating in the Panel Study

Age	Mother	Father	Education	Mother	Father
Years	%	%	Level	%	%
<30	0.0	0.0	≤8th grade	0.0	1.8
31-35	2.7	1.8	Some H.S.	6.7	8.8
36-40	36.0	16.4	H.S. grad	30.7	29.8
41-45	36.0	43.6	Some college	32.0	22.8
46-50	12.0	20.0	College grad	20.0	24.6
51-55	12.0	9.1	Grad/Prof Sch	10.6	12.2
56-60	1.3	5.5			
≥61	0.0	3.6			

Fifty-two of the 83 participating families (62.7%) completed a youth interview as well as a mother and a father questionnaire. Of the 62 families who chose not to participate, most were urban, or low income, or minorities. Table 13 presents an overview of the families that participated in the panel study.

TABLE 13: Description of Households Participating in the Panel Study

Head of Household	%	Guardian	% Mother	% Father	Place of Residence	%	Family Income	%
Two parents	82.0	Natural	92.8	67.5	Farm/Rural area	48.1	Less than $10,000	8.4
Single mother	14.0	Adoptive	0.0	0.0	Small town	13.3	$10,001 - 20,000	13.3
Single father	4.0	Step-	0.0	0.0	Town	10.8	$20,001 - 30,000	20.5
		Missing	7.2	32.5	Small city	9.6	$30,001 - 55,000	25.3
					Suburbs	12.0	$55,001 - 75,000	12.0
					Large city	3.6	More than $75,000	8.5
					Missing	2.6	Missing	12.0

Comparison of Panel Group to the 1983 Total Sample

The proportions of youths from the panel group living in two parent and single parent homes were very similar to the 1983 total sample. For the panel group in 1987, 82 percent of the youths lived in two parent homes, 14 percent lived only with their mother and 4 percent lived only with their father. For the 1983 total sample, 82 percent of the youths lived in two parent homes, 16 percent lived only with their mother and 2 percent lived only with their father.

The degree of urbanicity was less for families in the panel group than in the total sample. Whereas 25.2 percent of families in the panel group lived in a small city, a large city or the suburbs of a large city, 32.5 percent of families in the total sample did the same.

Families in the panel study showed higher incomes than families in the total sample. Twenty-point-five percent of panel group families reported income greater than $55,000 per year compared to 4.7 percent of families in the total sample.

Panel study mothers were more educated than their counterparts in the total sample. Thirty-point-six percent of the mothers from the panel group were college graduates or had attended graduate or professional school compared to 20.6 percent of the mothers in the total sample. Panel study fathers also tended to be more educated than their counterparts in the total sample.

It is also interesting to note that based on youths' chronological age, more younger boys were maintained in the panel group than were represented in the total sample. On the other hand, girls in the panel group were more representative of girls in the earlier sample.

DATA COLLECTION

The principal instruments used to collect data for the MEAS I and MEAS II were a parent questionnaire and a child interview. While the interviewer queried the child, each parent or guardian in the household completed a questionnaire. "Items in the parent questionnaire and child interview schedule came, for the most part, from sources used in other studies" (Nelson, 1985, p. 60). Additional data gathering instruments for the first study were a household questionnaire and an interviewer observation sheet. These instruments were replaced or revised for the second study by the interviewer follow-up sheet and the interviewer follow-up questionnaire. The interviewer follow-up sheet provided information about the interviewer and the interview process. The interviewer follow-up questionnaire provided information about the interviewer's occupation, education, age and attitudes toward early adolescents. In addition, a handicapper questionnaire was inserted in each parent questionnaire for the MEAS II. The handicapper questionnaire provided information about parent's attitudes toward raising a child(ren) with special needs, for example, a physical handicap, a chronic illness such as diabetes, a learning disability or an emotional problem.

Instruments

The assessments used to measure the independent and dependent variables for this study were developed specifically for the MEAS I and were adopted in their entirety for the MEAS II. These instruments will be discussed in detail in the following chapter.

LIMITATIONS OF THIS STUDY

This study is limited by the previous studies it is taken from, that is, the Michigan Early Adolescent Survey I and II. Among the limitations are the small sample size and restricted population from which the panel study is drawn. Taken together, these limitations constrain the generalizability of the results.

A further limitation of the previous studies is that no attempt was made to control for the gender of the interviewer or respondent in the administration of the youth interview in 1983 or 1987. This could negate to some degree the neutral role of the interviewer. The interviewer's presence should not affect a respondent's perception of a question nor the answer given (Babbie, 1983). According to Nelson (1985), "There is some indication that the gender of the interviewer is related to differential information shared by the respondent" (p. 66). Such findings may be the result of methodological shortcomings, but the suggestion is that the gender of the interviewer is a biasing factor worthy of further study.

This study is also limited by the constraints of the Dictionary of Occupational Titles' (DOT) classification system. DOT ratings of tasks performed in an occupation relating to data, people and things are used in this study for the creation of certain criterion variables. However, the system seems biased against traditional female occupations, such as child care worker. According to the DOT, a child care worker functions with less complex responsibility and judgment in regard to data and people than a gas station attendant. They both share the lowest rating in regard to things. This has implications for the reliability of the present study, but it should be noted that the problem is not confined to this study alone. The inclusion of sex-stereotyping in measurement instruments and classification systems needs to be addressed in future research.

Other methodological shortcomings are contained in the new and unproven measurements employed in the MEAS I and II, as well as the present study. Interval measurement has been assumed to permit the analysis required, however the results gained should be viewed as tentative.

CHAPTER 4
ANALYSIS AND FINDINGS

OVERVIEW OF ANALYSIS

This chapter is divided into five major sections: (1) Career Interests; (2) Field—Level Interests; (3) Data, People, and Things; (4) Career Exploration; and (5) Careers for the Future. These sections correspond to the research questions stated in Chapter 1. Within each section, such things as measurement procedures, identification of criterion and predictor variables, operational definitions, methods of analysis, and findings are discussed.

Gender Differences

Junior high is the time when gender differences "exert important influences in curriculum choice, and when choice considerations become different in kind for males and females" (Herr & Cramer, 1988, p. 248). Review of the relevant literature indicated that the career interests of males and females at the junior high level and beyond are not the same (Crites, 1978; Kammer, 1985; Omvig & Thomas, 1974). Although it is not clear why these differences occur, gender differences become more pronounced in junior high school and beyond, and make separate analyses of career interests and exploration based on gender necessary. For this study, separate models for males and females will be used in the analyses.

CAREER INTERESTS

In the context of this study, career interests have been defined as what type of work an early or late adolescent thinks he or she would like to do as an adult. Also in this study, early adolescence has been argued to be a stage of human development separate from childhood and late adolescence. The transition from early to late adolescence and the significant changes that take place create an appropriate period in which to examine career interests.

Research Questions:

1.1 In what careers are early adolescents interested?

1.2 In what careers are late adolescents interested?

1.3 How do the career interests of early and late adolescents match future employment projections?

Measurement Procedures

According to Super and Crites (1962), there are four ways in which to assess an individual's interests. First, "expressed" interests—those things in which an individual expresses an interest—can be assessed. Second, "manifest" interests—what an individual actually does is an indication of what his or her interests are—can be observed. Third, interests can be assessed by "testing," for example, instruments have been designed to test an individual's interest in an occupation based on their knowledge, or lack of it, of the vocabulary used in that area. Finally, interests can be "inventoried," that is, an individual's interests can be determined from his or her responses to a list of occupations. This last technique is the most common means of assessing interests (Herr & Cramer, 1988).

The inventory method was employed in the MEAS I and II and used in this study. In 1983 and 1987, as part of the MEAS I and II, youths were asked to respond to the following question:

For each of the jobs that I say, tell me if you would like to be working in that job when you are older.

Youths at both points in time were asked to consider 20 selected jobs and if they would like working in each in the future. The jobs were selected from a variety of occupations. Some were well known and others had to be explained to the youths. They could choose from the following answers: Yes, very much, Probably, Maybe, Possibly, and Not at all. Table 14 shows the youths' preferences.

TABLE 14: Percent of Youths Answering "Yes, very much" and "Probably"

Occupation	1983 Total Sample	1983 Males	1983 Females	1987 Total Sample	1987 Males	1987 Females
Architect	28	35	21	27	38	16
Baker	27	25	28	18	18	18
Bulldozer operator	11	23	0	6	8	5
Chemist	27	45	9	14	18	12
Child care worker	41	18	63	33	10	54
Computer specialist	55	73	40	30	43	19
Dietician	12	10	14	8	8	9
Doctor (medical)	39	48	30	27	33	21
Factory worker	16	30	2	10	13	7
Farmer or Farm manager	23	35	12	12	15	9
Fish and wildlife specialist	36	53	21	19	35	5
Gas station attendant	6	5	7	1	0	2
Lawyer	44	55	33	36	45	28
Librarian	17	10	23	8	3	14
Miner	6	13	0	4	8	0
Nurse	27	10	42	21	8	33
School Counselor	29	25	33	22	15	28
Secretary	36	8	63	25	8	42
Space engineer	33	60	7	23	45	2
Teacher	45	38	51	33	28	37

For early adolescents, the occupations that the greatest proportions of the youths indicated a preference for were: computer specialist (55%); teacher (45%); lawyer (44%); work with handicapped (42%); and child care worker (41%). Four years later, no one occupation was selected as often as the top five in 1983, and two new occupations were added to the list. As late adolescents the occupations that the greatest proportions of the youths indicated a preference for were: lawyer (36%); teacher and child care worker (33%); computer specialist (30%); and architect and doctor (27%). In general, males preferred technical and legal careers and females preferred service careers.

The occupations most preferred by early adolescent males were: computer specialist (73%); space engineer (60%); lawyer (55%); fish and wildlife specialist (53%); doctor (48%); and chemist (45%). The occupations most preferred by males four years later were: space engineer and lawyer (45%); computer specialist (43%); architect (38%); fish and wildlife specialist (35%); and doctor (33%).

The occupations most preferred by early adolescent females were: child care worker and secretary (63%); work with handicapped (56%); teacher (51%); and nurse (42%). In late adolescence, the occupation most preferred by females was still child care worker (54%). The other

occupations preferred by females were: secretary (42%); teacher (37%); nurse (33%); and lawyer and school counselor (28%).

Analysis

For this study, the youths' responses to the preceding list of occupations were coded as follows:

Yes, very much	= 3
Probably	= 2
Maybe, possibly	= 1
Not at all	= 0

It is assumed that the variable *level of interest* has been measured on an equal-interval scale, thereby attaining an interval level of measurement. Based on the youths' responses, the mean score for each occupation was computed and the occupations were ranked according to this score. There were no missing data. Table 15 presents the rankings of occupations from the MEAS I & II.

TABLE 15: Occupation Rankings from the MEAS I & II by Total Sample & Gender

	TOTAL SAMPLE				FEMALES				MALES			
	1983		1987		1983		1987		1983		1987	
Occupation	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean
Computer Specialist	1	1.69	3	1.12	5	1.37	7	.79	1	2.03	1	1.48
Teacher	2	1.46	2	1.18	3	1.65	2	1.33	7	1.25	7	1.03
Doctor	3	1.41	6	.90	6	1.19	8	.77	4	1.65	6	1.05
Lawyer	4	1.40	1	1.19	7	1.16	5	.95	4	1.65	2	1.45
Child Care Worker	5	1.30	4	1.08	1	1.79	1	1.61	13	.75	13	.53
Fish & Wildlife Spec	6	1.24	10	.71	11	.84	15	.30	3	1.68	5	1.15
Space Engineer	7	1.12	11	.69	16	.42	17	.19	2	1.88	3	1.23
Secretary	8	1.05	8	.78	2	1.67	3	1.21	18	.38	16	.33
School Counselor	9	1.04	7	.81	7	1.16	4	.98	12	.90	11	.63
Chemist	10	1.00	13	.63	13	.63	14	.40	6	1.40	8	.88
Baker	11	.99	9	.75	9	1.02	10	.74	11	.95	9	.75
Nurse	12	.96	11	.69	4	1.54	5	.95	19	.35	15	.40
Farmer or Farm Mgr	13	.92	14	.52	13	.63	13	.44	8	1.23	12	.60
Architect	14	.90	5	.98	12	.70	8	.77	9	1.13	4	1.20
Factory Worker	15	.72	15	.49	17	.37	15	.30	10	1.10	10	.70
Librarian	16	.63	17	.45	10	.93	11	.63	20	.30	20	.25
Dietician	17	.55	16	.47	13	.63	12	.61	16	.48	16	.33
Gas Station Attendant	18	.40	19	.23	18	.26	17	.19	15	.55	18	.28
Bulldozer Operator	19	.37	18	.31	20	.02	19	.12	13	.75	14	.50
Miner	20	.25	20	.16	19	.07	20	.05	17	.45	18	.28

To test the significance of the difference between means at the two points in time, a paired-groups t-test was used. Table 16 presents the levels of significance for a two-tailed test.

TABLE 16: Levels of Significance of the Differences of the Mean Rankings of Occupations in 1983 and 1987

	Levels of significance for two-tailed test		
	Total Sample	Males	Females
Occupation	p	p	p
Architect	.5739	.7303	.6365
Baker	.0699	.3157	.1226
Bulldozer operator	.4087	.1242	.2097
Chemist	.0020**	.0040**	.1511
Child care worker	.0973	.2024	.2903
Computer specialist	.0001***	.0038**	.0017**
Dietician	.4222	.3095	.8780
Doctor	.0002***	.0051**	.0204*
Factory worker	.0141*	.0096**	.5191
Farmer or farm manager	.0009***	.0020**	.1597
Fish and wildlife specialist	.0001***	.0022**	.0032**
Gas station attendant	.0259*	.0198*	.4733
Lawyer	.0876	.2907	.1727
Librarian	.0543	.6433	.0461*
Miner	.2078	.2415	.6600
Nurse	.0311*	.6885	.0072**
School counselor	.0893	.1687	.3153
Secretary	.0269*	.6753	.0217*
Space engineer	.0001***	.0011**	.0397*
Teacher	.0296*	.1928	.0848

* significant at the .05 level
** significant at the .01 level
*** significant at the .001 level

The correlations between the mean rankings of occupations by youths in 1983 and the mean rankings of occupations by youths in 1987 are presented in Table 17.

TABLE 17: Spearman Rank-Order Coefficient of Correlation for Rankings of Occupations by Youths in 1983 and 1987

Occupation	N	ΣD^2	Rho	Z	p	Rho corrected for ties	Z corrected for ties	p	#X tied groups	#Y tied groups
Architect	83	57422	.40	3.598	.0003	.32	2.897	.0038	4	4
Baker	83	70919	.26	2.316	.0206	.13	1.183	.2368	4	4
Bulldozer Oper	83	32587	.66	5.958	.0001	.38	3.406	.0007	3	4
Chemist	83	54051	.43	3.919	.0001	.33	3.025	.0025	4	4
Child Care Wkr	83	53265	.44	3.993	.0001	.39	3.483	.0005	4	4
Computer Spc	83	58174	.39	3.527	.0004	.32	2.934	.0033	4	4
Dietician	83	53559	.44	3.965	.0001	.24	2.157	.031	4	4
Doctor	83	61184	.36	3.241	.0012	.29	2.596	.0094	4	4
Factory Wkr	83	40851	.57	5.173	.0001	.46	4.187	.0001	4	3
Farmer/Farm Mgr	83	44130	.54	4.861	.0001	.41	3.731	.0002	4	4
Fish/Wildlife Spc	83	48893	.49	4.409	.0001	.41	3.750	.0002	4	4
Gas Station Atdt	83	36840	.61	5.554	.0001	.34	3.086	.002	3	3
Lawyer	83	48622	.49	4.435	.0001	.45	4.063	.0001	4	4
Librarian	83	48978	.49	4.401	.0001	.33	2.946	.0032	3	3
Miner	83	26939	.72	6.495	.0001	.24	2.188	.0287	4	3
Nurse	83	56488	.41	3.687	.0002	.30	2.668	.0076	4	4
School Counselr	83	74441	.22	1.981	.0476	.12	1.058	.2902	4	4
Secretary	83	48455	.49	4.450	.0001	.41	3.752	.0002	4	4
Space Engineer	83	37536	.61	5.488	.0001	.54	4.875	.0001	4	4
Teacher	83	52633	.45	4.053	.0001	.40	3.597	.0003	4	4

For 15 of the 20 choices, there was only a moderate correlation (.30 to .54; Rho corrected for ties) between the rankings of occupations by the youths in 1983 and 1987. This suggests that there was still a good amount of fluctuation in the youth's career interests as they moved through adolescence.

Intensity of Interest

As a group, the intensity of interest in the twenty occupations was low to moderate. The potential range of interest was 0 to 3. In 1983, the lowest mean score for an occupation was .25 for miner; the highest was 1.69 for computer specialist. In 1987, the lowest mean score for an occupation was .16 for miner; the highest was 1.19 for lawyer. Whereas in 1983 the mean intensity of interest was below 1.00 for 10 of the 20 occupations, in 1987 the mean intensity of interest was below 1.00 for 16 of the 20 occupations. As presented previously in Table 16, the intensity

of interest decreased significantly for 11 of the 20 occupations from 1983 to 1987. The decreases in the mean intensity of interest were statistically significant across the MEAS, male, and female groups for computer specialist, doctor, fish and wildlife specialist, and space engineer.

For females in 1983, the lowest mean score for an occupation was .02 for bulldozer operator; the highest was 1.79 for child care worker. For females in 1987, the lowest mean score for an occupation was .05 for miner; the highest was 1.61 for child care worker. In 1983 and 1987, the three occupations in which females expressed the highest intensity of interest are traditionally female occupations. Based on Bureau of Labor Statistics actual employment figures for 1986, traditionally female occupations are those in which 70 percent or more of the members are women. Table 18 presents these findings.

TABLE 18: Top Occupations—Females

	1983			1987		
Occupation	Rank	Mean	Std. Error	Rank	Mean	Std. Error
Child care worker	1	1.79	.11	1	1.61	.16
Secretary	2	1.67	.13	3	1.21	.16
Teacher	3	1.65	.15	2	1.33	.17

For males in 1983, the lowest mean score for an occupation was .30 for librarian; the highest was 2.03 for computer specialist. This score was the highest for any occupation—for males, females or the MEAS in 1983 or 1987. For males in 1987, the lowest mean score for an occupation was .25 for librarian; the highest was 1.48 for computer specialist. In 1983 and 1987, the five occupations in which males expressed the highest intensity of interest are traditionally male occupations. Based on Bureau of Labor Statistics actual employment figures for 1986, traditionally male occupations are those in which 70 percent or more of the members are men. Table 19 presents these findings.

TABLE 19: Top Occupations—Males

Occupation	Rank	1983 Mean	Std. Error	Occupation	Rank	1987 Mean	Std. Error
Computer specialist	1	2.03	.17	Computer specialist	1	1.48	.15
Space engineer	2	1.88	.16	Space engineer	3	1.23	.15
Fish & wildlife specialist	3	1.68	.17	Fish & wildlife specialist	5	1.15	.15
Doctor	4	1.65	.17	Architect	4	1.20	.16
Lawyer	4	1.65	.17	Lawyer	2	1.45	.16

Overall, the mean scores for males were higher than for females. Males scored higher on traditionally male occupations; females higher on traditionally female occupations.

Occupation Rankings Compared to BLS Numbers and Projections

To compare the youths' career interests to projections of the careers of the future, the mean scores and ranks were compared to the Bureau of Labor Statistics (BLS) actual employment figures for 1986 and employment projections to the year 2000. The BLS publishes three sets of occupational projections—high, moderate, and low—which are tied to economic and industry employment projections. "However, the basic changes in the occupational structure of the economy from 1986 to 2000 among the three alternatives are similar" (Silvestri & Lukasiewicz, 1987, p. 46). For this reason and for ease of presentation, the moderate alternative has been used in this study. Table 20 presents the youths' occupation rankings compared to BLS actual employment figures for 1986 and projections to the year 2000.

TABLE 20: Occupation Rankings Compared to BLS Numbers and Projections

	MEAS				BLS	
	1983		1987		1986	1986-2000
Occupation	Rank	Mean	Rank	Mean	Number in thousands	Percent change
Computer Specialist	1	1.69	3	1.12	309	54
Teacher	2	1.46	2	1.18	2,655	17
Doctor	3	1.41	6	.90	491	38
Lawyer	4	1.40	1	1.19	527	36
Child Care Worker	5	1.29	4	1.08	589	20
Fish & Wildlife Spec	6	1.24	10	.71	36	15
Space Engineer	7	1.12	11	.69	53	11
Secretary	8	1.05	8	.78	3,234	13
School Counselor	9	1.04	7	.81	123	21
Chemist	10	1.00	13	.63	86	11
Baker	11	.99	9	.75	114	42
Nurse	12	.96	11	.69	1,406	44
Farmer or Farm Mgr	13	.92	14	.52	1,336	-21
Architect	14	.90	5	.98	84	30
Factory Worker	15	.72	15	.49	2,701	-4
Librarian	16	.63	17	.45	136	13
Dietician	17	.55	16	.47	40	34
Gas Station Attendant	18	.40	19	.23	299	-5
Bulldozer Operator	19	.37	18	.30	92	12
Miner	20	.25	20	.16	783	-7

Findings

Computer specialist was the occupation projected to be the fastest growing by the BLS (54% increase, 1986-2000) of those presented in the MEAS. In 1983, computer specialist ranked first among early adolescents with a mean intensity of interest of 1.69. The mean intensity of interest in computer specialist decreased significantly to 1.12 ($p = .0001$) in 1987 to rank third among late adolescent career interests.

The mean intensity of interest in computer specialist ranked first for early and late adolescent males, although the mean decreased significantly from 2.03 in 1983 to 1.48 in 1987 ($p = .0038$).

The mean intensity of interest in computer specialist ranked fifth for early adolescent females and seventh for late adolescent females. The mean decreased significantly from 1.37 in 1983 to .79 in 1987 ($p = .0017$).

Other occupations that are projected by the BLS to grow by 30 percent or more from 1986 to 2000 are nurse (44%), baker (42%), doctor (38%), lawyer (36%), dietician (34%), and architect (30%). Early and late adolescent males showed a higher mean intensity of interest in doctor, lawyer and architect (traditionally male occupations) than did their female

counterparts. Early and late adolescent females showed a higher mean intensity of interest in nurse and dietician (traditionally female occupations) than did their male counterparts. Baker does not reach the 70 percent criterion to be classified as a male or female occupation. Early adolescent females showed a higher mean intensity of interest in baker than did their male counterparts. Four years later, males showed a slightly higher interest than females. For the adolescents as a group, the mean intensity of interest decreased significantly from 1983 to 1987 for doctor ($p = .0002$) and nurse ($p = .0311$).

Four of the twenty MEAS occupations are projected by the BLS to decline from 1986 to 2000. They are farmer or farm manager (-21%); miner (-7%); gas station attendant (-5%); and factory worker (-4%). These occupations were ranked 13th, 20th, 18th, and 15th respectively by early adolescent mean intensity of interest, and 14th, 20th, 19th, and 15th respectively by late adolescent mean intensity of interest. The four occupations ranked much the same based on male and female mean interests. According to the mean intensity of interest, farmer or farm manager, miner, gas station attendant, and factory worker ranked 8th, 17th, 15th, and 10th respectively in 1983 for males and 13th, 19th, 18th, and 17th for females. Four years later, they ranked 12th, 18th, 18th, and 10th respectively for males and 13th, 20th, 17th, and 15th respectively for females. For males, the mean intensity of interest decreased significantly from 1983 to 1987 for farmer or farm manager ($p = .0020$), gas station attendant ($p = .0198$), and factory worker ($p = .0096$).

FIELD—LEVEL INTERESTS

Most occupational classification methods are unidimensional, that is, occupations are classified on the basis of a single factor or variable (Herr & Cramer, 1988). Inventory methods of assessing occupational interests that follow these classification systems tend to be unidimensional also. Such a method was used in the preceding section of this chapter, wherein interest scores were related to specific occupations. However, more was intended for this study than to rank the stated interests of adolescents. To analyze the relationship between early adolescent career interests and late adolescent career interests, a multidimensional scheme based on Roe (1956) was adopted.

The basic idea behind Roe's theory is that occupational choice involves an attempt to meet needs (Brown & Brooks, 1990). Finding none of the available classifications of occupations to be useful to her research, Roe (1956) developed a multidimensional system for classifying occupations. Her system combines eight fields and six levels. The fields were derived from a factor analyses of interests. From these analyses, eight groups were selected that would indicate the primary focus of the activity. The six levels are based on the degree of responsibility, capacity, and skill involved in an occupation. "This dimension is essentially a continuum" (Roe, 1990, p. 73). For this study, the resulting field-level classification system has been adapted to create a multidimensional measure of early and late adolescent career interests.

Research Question:

2. What is the relationship between late adolescent career interests and early adolescent career interests, gender, age, place of residence, and parents' occupations?

Measurement Procedures

Table 21 presents each of Roe's eight occupational groups, or fields, as well as the six levels in each group. Placed on the chart according to her own classifications are the twenty occupations early and late adolescents were queried about in the MEAS I and II. Roe has classified all the occupations listed in the U.S. Department of Labor's 1965 Occupational Outlook Handbook. For this study, there are no occupations at level 6. This is not a problem, for according to Roe (1990), "It is probable that level 6 will become increasingly irrelevant and may be dropped" (p.74).

TABLE 21: Classification of Occupations (Based on Roe)

	FIELD							
LEVEL	Service	Business Contact	Business Organization	Technology	Outdoor	Science	General Culture	Arts and Entertainment
1 Professional and managerial (higher)						Doctor	Lawyer	
2 Professional and managerial (regular)				Space Engineer	Fish and Wildlife Specialist	Chemist Nurse	Teacher School Counselor	Architect
3 Semi-professional and managerial			Secretary	Computer Specialist	Farmer or Farm Manager	Dietician	Librarian	
4 Skilled	Child Care Worker				Miner			
5 Semi-skilled	Baker		Gas Station Attendant	Bulldozer Operator Factory Worker				
6 Unskilled								

To derive a Field-Level Interests Total Score for each of the 83 MEAS participants in 1983 and 1987 the following method was used.

1. Based on Roe (1956), each of the twenty MEAS occupations was given a field-level score as follows:

   Level 1 = 5
   Level 2 = 4
   Level 3 = 3
   Level 4 = 2
   Level 5 = 1
   Level 6 = 0

2. As stated in the previous section, each of the youths' responses to the list of twenty occupations was given an intensity of interest score as follows:

   Yes, very much = 3
   Probably = 2
   Maybe, possibly = 1
   Not at all = 0

3. For each occupation, the field-level score was multiplied by the intensity of interest score. These twenty scores were totaled for each participant. There was no missing data.

Criterion Variable

Late Adolescent Field-Level Interests (LAFLI)

Late adolescent career interests were defined for this part of this study to mean the combined field—level interest total scores from 1987. This was done for males and for females separately.

Predictor Variables

Early Adolescent Field-Level Interests (EAFLI)

Early adolescent career interests were defined for this study to mean the combined field—level interest total scores from 1983. This was done for males and for females separately.

Gender

As described at the beginning of this chapter, separate models for males and females will be used in the analyses.

Youth's Chronological Age (AGE)

For this study, youth's chronological age was assessed by one question asked during the MEAS I Youth Interview. The question and responses as stated were:

How old are you?	Response
	10
	11
	12
	13
	14

For each youth in this study, chronological age was defined by their response of 10, 11, 12, 13 or 14 to the question in the MEAS I. There was no missing data.

Place of Residence (POR)

Place of residence was selected as a predictor variable to examine the possible influence of the youth's human constructed environment upon career interests. Justification for inclusion of this variable is derived from the application of Bronfenbrenner's (1979) ecological framework by Hamilton (1982) to adolescent development and schooling. Hamilton called attention to the influence of the neighborhood, combined with the mutually reinforcing influences of the home, school and peer group, on the developing adolescent. Place of residence has been selected for this study to represent this concept.

For each youth in this study, place of residence was defined as the mother and/or father place of residence score derived from the 1987 MEAS. Place of residence was assessed by one question in the MEAS II Parent Questionnaire, answered separately by each parent. The question as stated was:

Where does your family live?
CIRCLE ONE NUMBER.

On a farm (40 acres or more)	1
In a rural area but not on a farm (less than 40 acres)	2
In a small town (under 5,000)	3
In a town of 5,000—25,000	4
In a city of 25,000—100,000	5
Inside the city limits of a large city over 100,000	6
In a suburb of a large city over 100,000	7

For each of the 83 youths participating in the panel study, a place of residence score reflecting the degree of urbanicity was calculated as follows:

1. From the place of residence question in the MEAS II , each of the parents' responses was given a score as follows:

Place 1 = 1
Place 2 = 1*
Place 3 = 2
Place 4 = 3
Place 5 = 4
Place 6 = 6**
Place 7 = 5

* Places 1 and 2 were combined to form rural area, not town
** Place 6 (large city) was scored above Place 7 (suburb of large city) to better reflect the degree of urbanicity

2. There was at least one parent for each of the 83 youths in the panel study. Twelve of these were single mothers; three were single fathers. In two parent households, three mothers and fifteen fathers did not complete a questionnaire for the study. Of the 56 fathers in two-parent households who completed questionnaires, 2 did not answer the question. All of the 77 mothers in two-parent households who completed questionnaires answered the question. In cases where there was a single parent or missing data, the score of the parent who participated was used. In cases where two parents participated, no differences in their responses were observed so the mother's score was used.

Parents' Field-Level (PFL)

Parents' field—level was selected as a predictor variable to examine the possible influence of the youth's parents upon career interests. Justification for inclusion of this variable is derived from the application of Bronfenbrenner's (1979) ecological framework and Roe's (1956) theory of personality development and career choice to adolescent career development. The variable parents' field—level was found to be highly correlated to family income and parents' education levels as reported in the MEAS, and according to Roe represents the degree of responsibility, capacity and skill involved in parents' occupations. Thus, to examine the multidimensional influences of parents upon early to late adolescent career development, parents' field—level has been selected for inclusion in this study.

For each youth in this study, parents' occupations was defined as the mother and/or father field—level score derived from the 1987 MEAS. In 1987, each parent who completed a MEAS questionnaire was asked to fill in the following: What is your occupation? To derive a Field-Level

Score for the parents of each of the 83 MEAS participants, the following method was used:

1. Based on Roe (1956), each of the responding parents' occupations was given a field-level score as follows:
   Level 1 = 5
   Level 2 = 4
   Level 3 = 3
   Level 4 = 2
   Level 5 = 1
   Level 6 = 0
2. There was at least one parent for each of the 83 youths in the panel study. Twelve of these were single mothers; three were single fathers. In two-parent households, three mothers and fifteen fathers did not complete a questionnaire for the study. Of the 77 mothers in two-parent households who completed questionnaires, 5 did not answer the question. Of the 56 fathers in two-parent households who completed questionnaires, 1 did not answer the question. In cases where there was a single parent or missing data, the field-level score of the parent who participated was used. In cases where two parents participated, the mean of the two field-level scores was used.

Analysis: Criterion Variables

The range for male late adolescent field—level interests was 9 to 101 with a mean of 51.250, standard deviation of 23.390, and standard error of 3.698. The range for female late adolescent field—level interests was 9 to 93 with a mean of 43.907, standard deviation of 19.836, and standard error of 3.025. On the average, males showed greater intensity of interest in more occupations across field—levels than females. In addition, male field—level interests were more dispersed than female field—level interests during late adolescence.

Analysis: Predictor Variables

The range for male early adolescent field—level interests was 24 to 131 with a mean of 69.750, standard deviation of 30.632, and standard error of 4.843. The range for female early adolescent field—level interests was 31 to 101 with a mean of 60.558, standard deviation of 19.035, and standard error of 2.903. On the average, males showed greater intensity of interest in more occupations across field—levels than females. In addition, male field—level interests were more dispersed than female field—level interests during early adolescence.

The range for male age was 10 to 14 with a mean of 11.800, standard deviation of 1.224, and standard error of .193. The range for female age was 10 to 14 with a mean of 12.163, standard deviation of 1.214, and standard error of .185. Seventeen-point-five percent of males and 11.6 percent of females were age ten; 22.5 percent of males and 16.3 percent of females were age eleven; 32.5 percent of males and 30.2 percent of females were age twelve; 17.5 percent of males and 27.9 percent of females were age thirteen; 10.0 percent of males and 14.0 percent of females were age fourteen.

Seventy-two point five percent of males and 72.1 percent of females lived in areas with a population less than 25,000, whereas 27.5 percent of males and 27.9 percent of females lived in areas with a population greater than 25,000.

The range for male parents' field—level was 0 to 4 with a mean of 2.775, standard deviation of 1.062, and standard error of .168. The range for female parents' field—level was 0 to 4 with a mean of 2.233, standard deviation of .996, and standard error of .152. For males, 17.5 percent of their parents held occupations that were higher or regular professional and managerial (values 5 and 4); 17.5 percent of their parents held occupations that were semi-professional and managerial (value 3); 42.5 percent of their parents held occupations that were skilled (value 2); and 22.5 percent of their parents held occupations that were semi-skilled or unskilled (values 1 and 0). For females, 16.3 percent of their parents held occupations that were higher or regular professional and managerial (values 5 and 4); 18.6 percent of their parents held occupations that were semi-professional and managerial (value 3); 44.2 percent of their parents held occupations that were skilled (value 2); and 20.9 percent of their parents held occupations that were semi-skilled or unskilled (values 1 and 0).

Analysis: Stepwise Multiple Regression

Stepwise multiple regression was the statistical tool chosen to examine the relationship between late adolescent career interests and early adolescent career interests, gender, age, place of residence, and parents' occupations. "[T]his procedure is, in fact, an improved version of the forward-selection procedure. . . .The improvements involve the re-examination at every stage of the regression of the variables

incorporated into the model in previous stages" (Draper & Smith, 1981, p.171). The general form of the regression equation is:

$$Y = a + b_1x_1 + b_2x_2 + \ldots + b_kb_k + e$$

where Y represents the dependent variable; a is the Y intercept; b is the slope; x represents the independent variables; and e is the error term (Kim & Kohout, 1975).

The multiple regression equations tested here were:

$$Y_1 = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + e$$

where Y_1 = male late adolescent field—level interests
and x_1 = early adolescent field—level interests (for males)
x_2 = youth's chronological age (for males)
x_3 = place of residence (for males)
x_4 = parents' field—level (for males)

$$Y_2 = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + e$$

where Y_2 = female late adolescent field—level interests
and x_1 = early adolescent field—level interests (for females)
x_2 = youth's chronological age (for females)
x_3 = place of residence (for females)
x_4 = parents' field—level (for females)

Assumptions

According to Kim & Kohout (1975), the use of regression analysis is based on the following set of assumptions:

1. The sample is drawn at random.
2. Each array of Y for a given combination of X's follows the normal distribution.
3. The regression of Y and X's is linear.
4. All the Y arrays have the same variance. (p. 341)

The homogeneity of variance and the linearity assumptions were evaluated through the direct examination of residuals. No problems were found. Also, the assumptions of normality and random sampling were assessed to have been met.

To assess multicollinearity, each independent variable was regressed on each of the other independent variables (Lewis-Beck, 1980). None of the variables in the male or female models were found to be highly collinear.

The findings for male late adolescent field—level interests were based on 40 cases; female late adolescent field—level interests were based on 43 cases. Each model met the minimum standard of at least 10 cases per variable (Craft, 1990).

Findings: Male Late Adolescent Field—Level Interests

The regression procedure terminated after one step. The resultant $R = .468$ and adjusted $R^2 = .199$ indicated that male EAFLI explained 19.9% of the variance in male LAFLI. The model had an F-ratio of 10.622 significant at the .01 level. The relationship between male EAFLI and male LAFLI was positive. Table 22 presents the regression of predictor variables on male late adolescent field—level interests.

Findings: Female Late Adolescent Field—Level Interests

The regression procedure terminated after one step. The resultant $R = .166$ and adjusted $R^2 = .004$ indicated that female POR explained .4% of the variance in female LAFLI. The model had an F-ratio of 1.156 and was not significant. Table 23 presents the regression of predictor variables on female late adolescent field—level interests.

TABLE 22: Regression of Predictor Variables on Male LAFLI

Predictor Variables	Simple r	Multiple R	R^2	Adjusted R^2	Regression Coefficient	Constant a
EAFLI	.468	.468	.219	.199	.357	26.319

F = 10.622 significant at .01 level

Variables Not in Equation

Variable	Partial Correlation
AGE	-.136
POR	-.025
PFL	.066

TABLE 23: Regression of Predictor Variables on Female LAFLI

Predictor Variables	Simple r	Multiple R	R^2	Adjusted R^2	Regression Coefficient	Constant a
POR	-.166	.166	.027	.004	-1.640	49.514

F = 1.156 not significant

Variables Not in Equation

Variable	Partial Correlation
EAFLI	.122
AGE	.012
PFL	.082

DATA, PEOPLE, AND THINGS

Every occupation requires a worker to function to some degree in relation to data, people, and things. The 1977 Fourth Edition Dictionary of Occupational Titles (DOT), which defines and classifies approximately 20,000 occupations performed for pay in the U.S. economy, provides worker function ratings of the tasks performed in an occupation relating to data, people, and things. There are six basic parts to an occupational definition contained in the DOT (1978).

1. The Occupational Code Number
2. The Occupational Title
3. The Industry Designation
4. Alternate Title (if any)
5. The Body of the Definition
    a. Lead statement
    b. Task element statements
    c. "May" items
6. Undefined Related Titles (if any)

Of interest to this study are the occupational title and code number. Table 24 presents the twenty occupations from the MEAS with their corresponding DOT occupational title and code number. Note that whenever the MEAS title did not exactly match the DOT title, the selected title and code number was determined from the other five parts of the DOT occupational definition.

TABLE 24: Description of Occupations With DOT Code Numbers

MEAS Occupational Title	DOT Occupational Title	DOT Code Number
Architect	Architect	001.061—010
Baker	Baker	526.381—010
Bulldozer Operator	Bulldozer Operator	850.683—010
Chemist	Chemist	022.061—010
Child Care Worker	Child-Day-Care Center Worker	359.677—018
Computer Specialist	Computer Operator	213.362—010
Dietician	Dietician, Clinical	077.127—014
Doctor	Physician, General Practice	070.101—022
Factory Worker	Assembler, Production	706.687—010
Farmer or Farm Manager	Farmer, General	421.161—010
Fish and Wildlife Specialist	Fish and Game Warden	379.167—010
Gas Station Attendant	Automobile-Service-Station Attendant	915.467—010
Lawyer	Lawyer	110.107—010
Librarian	Librarian	100.127—014
Miner	Miner	939.281—010
Nurse	Nurse, General Duty	075.374—010
School Counselor	Social Worker, School	195.107—038
Secretary	Secretary	201.362—030
Space Engineer	Aerospace Engineer	002.061—014
Teacher	Teacher, Secondary School	091.227—010

As indicated, each DOT definition is assigned a unique nine-digit code number. The first three digits refer to a particular occupational group. The middle three digits refer to worker traits. The last three digits indicate the alphabetical order of titles within the six-digit code groups.

Of interest to this study are the middle three digits because they represent the degree to which a worker functions in relation to data, people, and things. A separate digit expresses the worker's relationship to each of the three items. "The identification attached to these relationships are referred to as worker functions, and provide standard terminology for use in summarizing exactly what a worker does on the job" (DOT, 1977, p. 1369).

Each of these three items—data, people, and things—has a hierarchy at which a worker is required to function. The hierarchies are arranged in a descending order of complexity. The more a worker functions with complex responsibility and judgment, the lower the number; the less complicated the function, the higher the number. Following are the hierarchies for each digit:

DATA (4th Digit)	PEOPLE (5th Digit)	THINGS (6th Digit)
0 Synthesizing	0 Mentoring	0 Setting Up
1 Coordinating	1 Negotiating	1 Precision Working
2 Analyzing	2 Instructing	2 Operating-Controlling
3 Compiling	3 Supervising	3 Driving-Operating
4 Computing	4 Diverting	4 Manipulating
5 Copying	5 Persuading	5 Tending
6 Comparing	6 Speaking-Signaling	6 Feeding-Offbearing
	7 Serving	7 Handling
	8 Taking Instructions Helping	

As indicated in the preceding section, Roe developed a field—level classification system based on the primary focus, as well as the degree of responsibility, capacity, and skill involved in an occupation. The middle three digits of the DOT code number refer to worker traits and indicate what a worker does on the job. Conceptually, the two classification methods are similar. In relation to this study, the data, people, and things hierarchies are a further refinement of late adolescent field—level interests.

Measurement Procedures

To derive a Data Interests Total Score, People Interests Total Score, and Things Interests Total Score for each of the 83 MEAS participants in 1987 the following method was used.

1. Based on the DOT (1977), each of the twenty MEAS occupations was given a data, people and things score according to the middle three digits of the occupation's unique nine-digit code number as follows:

DATA (4th Digit)	PEOPLE (5th Digit)	THINGS (6th Digit)
0 = 6	0 = 8	0 = 7
1 = 5	1 = 7	1 = 6
2 = 4	2 = 6	2 = 5
3 = 3	3 = 5	3 = 4
4 = 2	4 = 4	4 = 3
5 = 1	5 = 3	5 = 2
6 = 0	6 = 2	6 = 1
	7 = 1	7 = 0
	8 = 0	

2. As stated in the first section, each of the youths' responses to the list of twenty occupations was given an intensity of interest score as follows:

Yes, very much = 3
Probably = 2
Maybe, possibly = 1
Not at all = 0

3. For each occupation, the data, people, and things scores were multiplied by the intensity of interest score. For each participant, a Data Interests Total Score, People Interests Total Score, and Things Interests Total Score was calculated by totaling the scores from the respective twenty occupations. There was no missing data.

Criterion Variables

Late Adolescent Data Interests (LADI)

Late adolescent career interests were defined for this part of this study to mean the combined data interest total scores from 1987. This was done for males and for females separately.

Late Adolescent People Interests (LAPI)

Late adolescent career interests were defined for this part of this study to mean the combined people interest total scores from 1987. This was done for males and for females separately.

Late Adolescent Things Interests (LATI)

Late adolescent career interests were defined for this part of this study to mean the combined things interest total scores from 1987. This was done for males and for females separately.

Analysis: Criterion Variables

The range for male late adolescent "data" interests was 8 to 106 with a mean of 53.050, standard deviation of 25.873, and standard error of 4.091. The range for female late adolescent "data" interests was 7 to 101 with a mean of 42.000, standard deviation of 21.188, and standard error of 3.231. On the average, males showed greater intensity of interest in more occupations across "data" levels than females. In addition, male data interests were more dispersed than female data interests during late adolescence.

The range for male late adolescent "people" interests was 1 to 88 with a mean of 36.725, standard deviation of 21.639, and standard error of 3.421. The range for female late adolescent "people" interests was 5 to 74 with a mean of 37.953, standard deviation of 17.975, and standard error of 2.741. On the average, females showed slightly greater intensity of interest in more occupations across "people" levels than males. In

addition, male people interests were more dispersed than female people interests during late adolescence.

The range for male late adolescent "things" interests was 49 to 75 with a mean of 60.000, standard deviation of 6.954, and standard error of 1.100. The range for female late adolescent "things" interests was 48 to 78 with a mean of 58.302, standard deviation of 6.453, and standard error of .984. On the average, males and females showed similar intensity of interest in occupations across "things" levels. In addition, male and female things interests were similarly dispersed during late adolescence.

Analysis: Predictor Variables

The predictor variables were discussed in the Field-Level Interests section.

Analysis: Stepwise Multiple Regression

Stepwise multiple regression was the statistical tool chosen to examine the relationship between late adolescent data interests and early adolescent career interests, gender, age, place of residence, and parents' occupations. The multiple regression equations tested here were:

$$Y_1 = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + e$$

where Y_1 = male late adolescent data interests
and x_1 = early adolescent field—level interests (for males)
x_2 = youth's chronological age (for males)
x_3 = place of residence (for males)
x_4 = parents' field—level (for males)

$$Y_2 = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + e$$

where Y_2 = female late adolescent data interests
and x_1 = early adolescent field—level interests (for females)
x_2 = youth's chronological age (for females)
x_3 = place of residence (for females)
x_4 = parents' field—level (for females)

The same procedure was used with late adolescent people interests and late adolescent things interests.

Assumptions

For each model, the homogeneity of variance and the linearity assumptions for regression were evaluated through the direct

examination of residuals. No problems were found. Also, the assumptions of normality and random sampling were assessed to have been met.

To assess multicollinearity, each independent variable was regressed on each of the other independent variables (Lewis-Beck, 1980). None of the variables in the male or female models were found to be highly collinear.

The findings for male late adolescent data, people, and things interests were based on 40 cases; female late adolescent data, people, and things interests were based on 43 cases. Each model met the minimum standard of at least 10 cases per variable (Craft, 1990).

Findings: Male Late Adolescent Data Interests

The regression procedure terminated after one step. The resultant $R = .412$ and adjusted $R^2 = .148$ indicated that male EAFLI explained 14.8% of the variance in male LADI. The model had an F-ratio of 7.787 significant at the .05 level. The relationship between male EAFLI and male LADI was positive. Table 25 presents the regression of predictor variables on male late adolescent data interests.

Findings: Female Late Adolescent Data Interests

The regression procedure terminated after one step. The resultant $R = .204$ and adjusted $R^2 = .018$ indicate that female POR explained 1.8% of the variance in female LADI. The model had an F-ratio of 1.774 and was not significant. Table 26 presents the regression of predictor variables on female late adolescent data interests.

Findings: Male Late Adolescent People Interests

The regression procedure terminated after two steps. The resultant $R = .481$ and adjusted $R^2 = .190$ indicated that male EAFLI and AGE explained 19.0% of the variance in male LAPI. The model had an F-ratio of 8.604 significant at the .01 level. The relationship between male EAFLI and male LAPI was positive; the relationship between male AGE and male LAPI was negative. Table 27 presents the regression of predictor variables on male late adolescent people interests.

Findings: Female Late Adolescent People Interests

No variables entered the regression. Table 28 presents the regression of predictor variables on female late adolescent people interests.

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Findings: Male Late Adolescent Things Interests

The regression procedure terminated after one step. The resultant R = .448 and adjusted R^2 = .180 indicated that male EAFLI explained 18.0% of the variance in male LATI. The model had an F-ratio of 9.537 significant at the .01 level. The relationship between male EAFLI and male LATI was positive. Table 29 presents the regression of predictor variables on male late adolescent things interests.

Findings: Female Late Adolescent Things Interests

The regression procedure terminated after one step. The resultant R = .200 and adjusted R^2 = .016 indicated that female POR explained 1.6% of the variance in female LATI. The model had an F-ratio of 1.704 and was not significant. Table 30 presents the regression of predictor variables on female late adolescent things interests.

TABLE 25: Regression of Predictor Variables on Male LADI ("Data")

Predictor Variables	Simple r	Multiple R	R^2	Adjusted R^2	Regression Coefficient	Constant a
EAFLI	.412	.412	.170	.148	.348	28.754

F = 7.787 significant at .05 level

Variables Not in Equation

Variable	Partial Correlation
AGE	-.096
POR	-.034
PFL	.065

TABLE 26: Regression of Predictor Variables on Female LADI ("Data")

Predictor Variables	Simple r	Multiple R	R^2	Adjusted R^2	Regression Coefficient	Constant a
POR	-.204	.204	.041	.018	-2.155	49.366

F = 1.774 not significant

Variables Not in Equation

Variable	Partial Correlation
EAFLI	.043
AGE	-.062
PFL	.129

TABLE 27: Regression of Predictor Variables on Male LAPI ("People")

Predictor Variables	Simple r	Multiple R	R^2	Adjusted R^2	Regression Coefficient	Constant a
EAFLI	.430	.430	.185	.163	.304	15.554
AGE	-.227	.481	.231	.190	-3.815	

F = 8.604 significant at .01 level

Variables Not in Equation

Variable	Partial Correlation
POR	-.031
PFL	.071

TABLE 28: Regression of Predictor Variables on Female LAPI ("People")

Variables Not in Equation

Variable	Partial Correlation
EAFLI	.136
AGE	.060
POR	-.033
PFL	.001

TABLE 29: Regression of Predictor Variables on Male LATI ("Things")

Predictor Variables	Simple r	Multiple R	R^2	Adjusted R^2	Regression Coefficient	Constant a
EAFLI	.448	.448	.201	.180	.102	52.907

F = 9.537 significant at .01 level

Variables Not in Equation

Variable	Partial Correlation
AGE	-.102
POR	-.010
PFL	.003

TABLE 30: Regression of Predictor Variables on Female LATI ("Things")

Predictor Variables	Simple r	Multiple R	R^2	Adjusted R^2	Regression Coefficient	Constant a
POR	-.200	.200	.040	.016	-.644	60.503

F = 1.704 not significant

Variables Not in Equation

Variable	Partial Correlation
EAFLI	.076
AGE	-.004
PFL	.078

CAREER EXPLORATION

As Herr & Cramer (1988) have stated

> Careers are unique to each person and created by what one chooses or does not choose. They are dynamic and unfolding throughout life. They include not only occupations but prevocational and post vocational concerns as well as integration of work with other roles: family, community, leisure (p.17).

Career exploration is the active investigation and consideration of future-oriented job opportunities. To the adolescent, exploration is a key phase in career development (Super, 1953; 1980). What an adolescent chooses or does not choose to explore in school, at home or in the community has an impact on his or her career choices in later life.

To assess late adolescent career exploration and the impact of early adolescent career interests upon it, a career exploration scale was created from the MEAS II Youth Interview data.

Research Question:

3. What is the relationship between late adolescent career exploration and early adolescent career interests, gender, age, place of residence, and parents' occupations?

Measurement Procedures

In 1987 as part of the MEAS II Youth Interview, participants were asked to respond to the following:

Think about a future job that you might someday like to have. Now, we're going to ask you about that job. The answers are:

1 = Never
2 = Once
3 = Several times
4 = Once a month
5 = More than once a month

Thinking about that future job, how often during the past year have you. . .

1. Talked about the job with relatives?
2. Talked about the job with friends?
3. Talked about the job with persons who do that job?
4. Talked about the job with teachers or counselors?
5. Read materials about the job?
6. Went and watched the job being done?
7. Saw the job being done on TV?

8. Tried out activities related to the job?
9. Thought about the steps necessary to prepare for the job?
10. Learned the range of pay for the job?
11. Learned the level of schooling or type of training required to do the job?
12. Thought about how well the job field matches your interests and abilities?

Separate scales were desired for males and for females. To derive two separate Late Adolescent Career Exploration scales (one for males and one for females) from the preceding 12-item question, the following method was used:

1. Each of the participant's twelve responses was given a score as follows:

More than once a month	=	5
Once a month	=	4
Several times	=	3
Once	=	2
Never	=	1

2. For each participant, the twelve scores were totaled. There was no missing data.
3. The total scores were divided into two scales according to gender.
4. The scale reliabilities were tested and are reported below.

Reliabilities of Late Adolescent Career Exploration Scales

	Mean Interitem Correlation	Cronbach's Alpha
Males	.380	.880
Females	.376	.879

Table 31 presents the frequencies for male and female responses to the items used in the career exploration scale.

TABLE 31: Career Exploration Scale Items

No.	Thinking about that future job, how often during the past year have you. . .	Percent of Males					Percent of Females				
		Never	Once	Sev-eral times	Once a month	More than once a month	Never	Once	Sev-eral times	Once a month	More than once a month
1.	Talked with relatives	17.5	20.0	32.5	15.0	15.0	11.6	23.3	48.8	7.0	9.3
2.	Talked with friends	2.5	12.5	52.5	12.5	20.0	9.3	4.7	67.4	9.3	9.3
3.	Talked with persons	35.0	20.0	32.5	2.5	10.0	37.2	27.9	20.9	4.7	9.3
4.	Talked with teachers	25.0	22.5	37.5	5.0	10.0	25.6	18.6	39.5	9.3	7.0
5.	Read materials	5.0	15.0	40.0	20.0	20.0	20.9	18.6	32.6	18.6	9.3
6.	Went and watched job	25.0	22.5	22.5	5.0	25.0	58.1	7.0	20.9	7.0	7.0
7.	Saw job on TV	17.5	5.0	47.5	15.0	15.0	27.9	18.6	37.2	4.7	11.6
8.	Tried activities	27.5	7.5	32.5	7.5	25.0	30.2	16.3	32.5	4.7	16.3
9.	Thought about steps	5.0	2.5	57.5	5.0	30.0	11.6	2.3	62.8	9.3	14.0
10.	Learned range of pay	17.5	20.0	32.5	12.5	17.5	44.2	25.6	18.6	2.3	9.3
11.	Learned level of school	7.5	35.0	35.0	7.5	15.0	20.9	18.6	44.2	4.7	11.6
12.	Thought about interests	2.5	10.0	50.0	12.5	25.0	7.0	9.3	51.1	18.6	14.0

Males and females were about as likely to have talked about a future job several times or more during the past year with relatives, friends, and teachers and counselors. Eighty-six percent of females and 85 percent of males reported that in the past year they had talked with friends about a future job several times or more. Approximately two-thirds of the females and males reported the same about relatives, and slightly more than one-half of the females and males reported the same about teachers and counselors. Forty-five percent of males and 35 percent of females said that they had talked with persons who do that job several times or more during the past year.

Males were more likely than females to have read materials about the job, went and watched the job being done, saw the job being done on TV, and tried out activities related to the job several times or more during the past year. Eighty percent of the males said that they read materials at least several times during the past year and 78 percent said that they saw the job being done on TV. Sixty-one and 54 percent of the females said the same respectively.

Ninety-three percent of the males and 86 percent of the females reported that they thought about the steps necessary to prepare for the job several times or more during the past year. Eighty-eight percent of the males and eighty-four percent of the females said they had thought about how well the job field matches their interests and abilities several times or more during the past year. Approximately two-thirds of the males and one-third of the females said that they had learned the range of pay, and more than half of the males and about two-thirds of the females said that they had learned the level of schooling or type of training required several times or more during the past year.

Criterion Variable

Late Adolescent Career Exploration (LACE)

Late adolescent career exploration was defined for this study to mean the combined career exploration total scores from 1987. This was done for males and for females separately.

Analysis: Criterion Variables

The range for male late adolescent career exploration was 22 to 58 with a mean of 36.075, standard deviation of 9.817, and standard error of 1.552. The range for female late adolescent career exploration was 16 to 49 with a mean of 33.233, standard deviation of 7.565, and standard error

of 1.154. On the average, males were more likely to explore careers than females.

Analysis: Predictor Variables

The predictor variables were discussed in the Field—Level Interests section.

Analysis: Stepwise Multiple Regression

Stepwise multiple regression was the statistical tool chosen to examine the relationship between late adolescent career exploration and early adolescent career interests, gender, age, place of residence, and parents' occupations. The multiple regression equations tested here were:

$$Y_1 = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + e$$

where Y_1 = male late adolescent career exploration
and x_1 = early adolescent field—level interests (for males)
x_2 = youth's chronological age (for males)
x_3 = place of residence (for males)
x_4 = parents' field—level (for males)

$$Y_2 = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + e$$

where Y_2 = female late adolescent career exploration
and x_1 = early adolescent field—level interests (for females)
x_2 = youth's chronological age (for females)
x_3 = place of residence (for females)
x_4 = parents' field—level (for females)

Assumptions

For each model, the homogeneity of variance and the linearity assumptions for regression were evaluated through the direct examination of residuals. No problems were found. Also, the assumptions of normality and random sampling were assessed to have been met.

To assess multicollinearity, each independent variable was regressed on each of the other independent variables (Lewis-Beck, 1980). None of the variables in the male or female models were found to be highly collinear.

The findings for male late adolescent career exploration were based on 40 cases; findings for female late adolescent career exploration

were based on 43 cases. Both meet the minimum standard of at least 10 cases per variable (Craft, 1990).

Findings: Male Late Adolescent Career Exploration

The regression procedure terminated after one step. The resultant R = .358 and adjusted R^2 = .105 indicated that male AGE explained 10.5% of the variance in male LACE. The model had an F-ratio of 5.576 significant at the .05 level. The relationship between male AGE and male LACE was positive. Table 32 presents the regression of predictor variables on male late adolescent career exploration.

Findings: Female Late Adolescent Career Exploration

The regression procedure terminated after one step. The resultant R = .348 and adjusted R^2 = .100 indicate that female AGE explained 10.0% of the variance in female LACE. The model had an F-ratio of 5.667 significant at the .05 level. The relationship between female AGE and female LACE was positive. Table 33 presents the regression of predictor variables on female late adolescent career exploration.

TABLE 32: Regression of Predictor Variables on Male LACE

Predictor Variables	Simple r	Multiple R	R^2	Adjusted R^2	Regression Coefficient	Constant a
AGE	.358	.358	.128	.105	2.870	2.211

F = 5.576 significant at .05 level

Variables Not in Equation

Variable	Partial Correlation
EAFLI	.063
POR	.111
PFL	.029

TABLE 33: Regression of Predictor Variables on Female LACE

Predictor Variables	Simple r	Multiple R	R^2	Adjusted R^2	Regression Coefficient	Constant a
AGE	.348	.348	.121	.100	2.172	6.813

F = 5.667 significant at .05 level

Variables Not in Equation

Variable	Partial Correlation
EAFLI	.002
POR	.214
PFL	-.050

CAREERS FOR THE FUTURE

Between 1986 and 2000, the BLS predicts more than 21 million new jobs will be added to the economy. Employment is expected to increase from 111 million to 133 million, representing an average growth rate for all occupations of 19 percent (Kutscher, 1988). Table 34 presents BLS categories for projected employment growth. More detailed information on projected changing employment between 1986 and 2000 for the twenty MEAS occupations is presented in Table 35.

TABLE 34: BLS Projected Employment Growth Categories

Changing employment between 1986 and 2000	
If the statement reads. . .	**Employment is expected to. . .**
Grow much faster than the average	Increase 35 percent or more
Grow faster than the average	Increase 25 to 34 percent
Grow about as fast as the average	Increase 14 to 24 percent
Grow more slowly than the average	Increase 5 to 13 percent
Show little change	Increase or decrease 4 percent or less
Decline	Decrease 5 percent or more

TABLE 35: Percent Change in Employment, 1986—2000

MEAS	BLS Projections 1986-2000	
Occupation	Percent Change in Employment	Employment Prospects
Architect	30	Grow faster than the average
Baker	42	Grow much faster than the average
Bulldozer Operator	12	Grow more slowly than the average
Chemist	11	Grow more slowly than the average
Child Care Worker	20	Grow about as fast as the average
Computer Specialist	54	Grow much faster than the average
Dietician	34	Grow faster than the average
Doctor	38	Grow much faster than the average
Factory Worker	-4	Show little change
Farmer or Farm Manager	-21	Decline
Fish and Wildlife Specialist	15	Grow about as fast as the average
Gas Station Attendant	-5	Decline
Lawyer	36	Grow much faster than the average
Librarian	13	Grow more slowly than the average
Miner	-7	Decline
Nurse	44	Grow much faster than the average
School Counselor	21	Grow about as fast as the average
Secretary	13	Grow more slowly than the average
Space Engineer	11	Grow more slowly than the average
Teacher	17	Grow about as fast as the average

Research Question:

4. What is the relationship between late adolescent interest in careers for the future and late adolescent career exploration, gender, age, place of residence, and parents' occupations?

Measurement Procedures

To derive a Careers for the Future Total Score based on the percent change in employment for each of the 83 MEAS participants in 1987 the following method was used.

1. Based on the BLS categories for projected employment growth, each of the twenty MEAS occupations was given a score as follows:

Increase 35 percent or more	=	5
Increase 25 to 34 percent	=	4
Increase 14 to 24 percent	=	3
Increase 5 to 13 percent	=	2
Increase or decrease 4 percent or less	=	1
Decrease 5 percent or more	=	0

2. As stated previously, each of the youths' responses to the list of twenty occupations was given an intensity of interest score as follows:

Yes, very much	=	3
Probably	=	2
Maybe, possibly	=	1
Not at all	=	0

3. For each occupation, the career for the future score was multiplied by the intensity of interest score. These twenty scores were totaled for each participant. There was no missing data.

Criterion Variable

Late Adolescent Interest in Careers for the Future (LAICF—P)

Late adolescent interest in careers for the future was defined for this part of the study to mean the combined careers for the future total scores (based on the percent change in employment from 1986—2000). This was done separately for males and for females in 1987.

Analysis: Criterion Variables

The range for male late adolescent interest in careers for the future was 8 to 107 with a mean of 48.750, standard deviation of 22.550, and standard error of 3.565. The range for female late adolescent interest in

careers for the future was 6 to 103 with a mean of 44.535, standard deviation of 21.444, and standard error of 3.271. On the average, males showed a greater intensity of interest in more occupations across employment growth projections than females. In addition, male interests in careers for the future were more dispersed than female interests in careers for the future during late adolescence.

Analysis: Predictor Variables

Late adolescent career exploration was discussed as a criterion variable in the previous section. The other predictor variables were discussed in the Field—Level Interests section.

Analysis: Stepwise Multiple Regression

Stepwise multiple regression was the statistical tool chosen to examine the relationship between late adolescent interest in careers for the future and late adolescent career exploration, gender, age, place of residence, and parents' occupations. The multiple regression equations tested here were:

$$Y_1 = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + e$$

where Y_1 = male late adolescent interest in careers for the future
and x_1 = late adolescent career exploration (for males)
x_2 = youth's chronological age (for males)
x_3 = place of residence (for males)
x_4 = parents' field—level (for males)

$$Y_2 = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + e$$

where Y_2 = female late adolescent interest in careers for the future
and x_1 = late adolescent career exploration (for females)
x_2 = youth's chronological age (for females)
x_3 = place of residence (for females)
x_4 = parents' field—level (for females)

Assumptions

For each model, the homogeneity of variance and the linearity assumptions for regression were evaluated through the direct examination of residuals. No problems were found. Also, the assumptions of normality and random sampling were assessed to have been met.

To assess multicollinearity, each independent variable was regressed on each of the other independent variables (Lewis-Beck, 1980). None of the variables in the male or female models were found to be highly collinear.

The findings for male late adolescent interest in careers for the future were based on 40 cases; findings for female late adolescent interest in careers for the future were based on 43 cases. Both meet the minimum standard of at least 10 cases per variable (Craft, 1990).

Findings: Male Late Adolescent Interest in Careers for the Future—Percent Change

No variables entered the regression. Table 36 presents the regression of predictor variables on male late adolescent interest in careers for the future.

Findings: Female Late Adolescent Interest in Careers for the Future—Percent Change

The regression procedure terminated after one step. The resultant $R = .165$ and adjusted $R^2 = .004$ indicate that female POR explained .4% of the variance in female LAICF—P. The model had an F-ratio of 1.148 and was not significant. Table 37 presents the regression of predictor variables on female late adolescent interest in careers for the future.

TABLE 36: Regression of Predictor Variables on Male LAICF—P

Variables Not in Equation

Variable	Partial Correlation
LACE	.033
AGE	-.146
POR	.053
PFL	.060

TABLE 37: Regression of Predictor Variables on Female LAICF—P

Predictor Variables	Simple r	Multiple R	R^2	Adjusted R^2	Regression Coefficient	Constant a
POR	-.165	.165	.027	.004	-1.767	50.575

F = 1.148 not significant

Variables Not in Equation

Variable	Partial Correlation
LACE	.078
AGE	-.007
PFL	.040

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Percent Change vs. Absolute Change in Employment, 1986—2000

The percent change in employment can be somewhat misleading. Even though an occupation is expected to grow rapidly, it may provide fewer openings than a slower growing but larger occupation. While occupations that are growing fast generally offer good opportunities, the numerical change in employment also is important because large occupations, such as secretary, may offer many more new jobs than a small, fast-growing occupation, such as dietician. For these reasons, careers for the future will be analyzed now using the BLS projections for numerical change in employment, 1986—2000. Table 38 presents the BLS figures for numerical change in employment, estimated employment and percent change in employment for each of the 20 MEAS occupations.

TABLE 38: BLS Estimates and Projections

	BLS		
Occupation	Numerical Change in Employment 1986-2000 Number in thousands	Estimated Employment 1986 Number in thousands	Percent Change in Employment 1986-2000 Percent
Architect	25	84	30
Baker	48	114	42
Bulldozer Operator	11	92	12
Chemist	9	86	11
Child Care Worker	118	589	20
Computer Specialist	167	309	54
Dietician	14	40	34
Doctor	187	491	38
Factory Worker	-108	2,701	-4
Farmer or Farm Mgr	-281	1,336	-21
Fish & Wildlife Spec	5	36	15
Gas Station Attendant	-15	299	-5
Lawyer	190	527	36
Librarian	18	136	13
Miner	-55	783	-7
Nurse	619	1,406	44
School Counselor	26	123	21
Secretary	420	3,234	13
Space Engineer	6	53	11
Teacher	451	2,655	17

From Table 38, the greatest numerical change will be in nursing (619,000 new jobs by 2000), whereas the greatest percentage increase will be in computer specialist (54% growth in jobs by 2000). Teacher, which is projected to grow about as fast as average at 17 percent, showed the second greatest numerical increase in job projections (451,000 new jobs by 2000). Secretary is projected to grow more slowly than average at 13 percent, however 420,000 new jobs are expected to be created by 2000, making this the 3rd biggest gain in workers, but the 12th fastest growing job. The biggest loser is farmer or farm manager with an expected loss of 281,000 workers or decline of 21 percent. The second biggest loser was factory worker. Although factory work is projected to decline by 4 percent, 108,000 jobs are expected to be lost.

Comparing these projections and estimates to the percent of late adolescents answering "Yes, very much" and "Probably" to the list of 20 MEAS occupations (Table 14), the occupations that the greatest proportions of the youths indicated a preference for were: lawyer (36%);

teacher and child care worker (33%); computer specialist (30%); and architect and doctor (27%). Each of these occupations is projected by the BLS to show moderate to high numerical increases as well as moderate to high percentage increases in new jobs from 1986—2000.

The occupations most preferred by late adolescent males were: space engineer and lawyer (45%); computer specialist (43%); architect (38%); fish and wildlife specialist (35%); and doctor (33%). All are traditionally male dominated occupations. The occupations most preferred by their female counterparts were child care worker (54%); secretary (42%); teacher (37%); nurse (33%); and lawyer and school counselor (28%). All except for lawyer are traditionally female occupations. Of the occupations cited here, space engineer and fish and wildlife specialist are projected by the BLS to show low numerical and percentage increases from 1986—2000. The others are projected to show moderate to high growth in both areas.

There was little interest expressed by either males or females in declining occupations, such as farmer or farm manager, factory worker, miner, or gas station attendant.

Measurement Procedures

To derive a Careers for the Future Total Score based on the numerical change in employment for each of the 83 MEAS participants in 1987 the following method was used.

1. Based on the BLS projections for numerical change in employment, 1986—2000, each of the twenty MEAS occupations was given a score as follows:

Increase by 200,000 or more	=	5
Increase from 150,000 to 199,000	=	4
Increase from 100,000 to 149,999	=	3
Increase from 50,000 to 99,999	=	2
Increase from 1,000 to 49,999	=	1
Increase by less than 1,000 or Decrease	=	0

2. As stated previously, each of the youths' responses to the list of twenty occupations was given an intensity of interest score as follows:

Yes, very much	=	3
Probably	=	2
Maybe, possibly	=	1
Not at all	=	0

3. For each occupation, the career for the future score was multiplied by the intensity of interest score. These twenty scores were totaled for each participant. There was no missing data.

Criterion Variable

Late Adolescent Interest in Careers for the Future (LAICF—N)

Late adolescent interest in careers for the future was defined for this part of the study to mean the combined careers for the future total scores (based on the numerical change in employment from 1986—2000). This was done separately for males and for females in 1987.

Analysis: Criterion Variables

The range for male late adolescent interest in careers for the future was 6 to 68 with a mean of 33.125, standard deviation of 16.607, and standard error of 2.626. The range for female late adolescent interest in careers for the future was 6 to 72 with a mean of 37.023, standard deviation of 15.048, and standard error of 2.295. On the average, females showed a greater intensity of interest in more occupations across employment growth projections than males. In addition, female interests in careers for the future were slightly more dispersed than male interests in careers for the future during late adolescence.

Analysis: Predictor Variables

Late adolescent career exploration was discussed as a criterion variable in the previous section. The other predictor variables were discussed in the Field—Level Interests section.

Analysis: Stepwise Multiple Regression

Stepwise multiple regression was the statistical tool chosen to examine the relationship between late adolescent interest in careers for the future and late adolescent career exploration, gender, age, place of residence, and parents' occupations. The multiple regression equations tested here were:

$$Y_1 = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + e$$

where Y_1 = male late adolescent interest in careers for the future

and x_1 = late adolescent career exploration (for males)

x_2 = youth's chronological age (for males)

x_3 = place of residence (for males)

x_4 = parents' field—level (for males)

$$Y_2 = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + e$$

where Y_2 = female late adolescent interest in careers for the future
and x_1 = late adolescent career exploration (for females)
x_2 = youth's chronological age (for females)
x_3 = place of residence (for females)
x_4 = parents' field—level (for females)

Assumptions

For each model, the homogeneity of variance and the linearity assumptions for regression were evaluated through the direct examination of residuals. No problems were found. Also, the assumptions of normality and random sampling were assessed to have been met.

To assess multicollinearity, each independent variable was regressed on each of the other independent variables (Lewis-Beck, 1980). None of the variables in the male or female models were found to be highly collinear.

The findings for male late adolescent interest in careers for the future were based on 40 cases; findings for female late adolescent interest in careers for the future were based on 43 cases. Both meet the minimum standard of at least 10 cases per variable (Craft, 1990).

Findings: Male Late Adolescent Interest in Careers for the Future—Numerical Change

No variables entered the regression. Table 39 presents the regression of predictor variables on male late adolescent interest in careers for the future.

Findings: Female Late Adolescent Interest in Careers for the Future—Numerical Change

No variables entered the regression. Table 40 presents the regression of predictor variables on female late adolescent interest in careers for the future.

TABLE 39: Regression of Predictor Variables on Male LAICF—N

Variables Not in Equation

Variable	Partial Correlation
LACE	.036
AGE	-.130
POR	.010
PFL	.059

TABLE 40: Regression of Predictor Variables on Female LAICF—N

Variables Not in Equation

Variable	Partial Correlation
LACE	-.051
AGE	-.037
POR	-.151
PFL	.046

Comparisons of Male and Female Multiple Regression Models

The male multiple regression models for late adolescent field—level interests, late adolescent data interests, late adolescent people interests, late adolescent things interests, and late adolescent career exploration were significant. Only the female multiple regression model for late adolescent career exploration was significant. The models for late adolescent interest in careers for the future were not significant for males or females.

The predictor variable early adolescent field—level interests was significantly related to male late adolescent field—level interests, late adolescent data interests, late adolescent people interests, and late adolescent things interests. The relationship of EAFLI to each criterion variable was positive.

The predictor variable age was significantly related to male late adolescent people interests and late adolescent career exploration, as well as to female late adolescent career exploration. The relationship of AGE to male LAPI was negative. The relationship of AGE to male LACE and female LACE was positive.

The predictor variables place of residence and parents' field—level were not found to be significant in any of the male or female models.

The implications of these findings will be discussed in the following chapter.

CHAPTER 5
CONCLUSIONS AND IMPLICATIONS

OVERVIEW

The development of career interests from early to late adolescence is a complex phenomenon. From a developmental perspective, "events prior to adolescence need to be considered as possible antecedents of vocational development; in turn, adolescent developments provide key antecedents of development in later life" (Vondracek et al., 1982, p. 604). From a philosophical perspective, the preceding statement by Vondracek et al. does not seem challenging. Common sense would dictate that events prior to some occurrence would need to be considered as possible antecedents to that occurrence. However, as the NSF (1978), Erb (1983), and Keith et al. (1983; 1987) have noted, there is a lack of research into the career interests of early adolescents. Consequently, little is known about the role early adolescence plays in the formation of late adolescent career interests. Simply put, the changing needs of adolescents in relation to career development are not being met (Benson et al., 1987; Carnegie Council, 1989). The question then becomes what events in early and late adolescence are significant to career development and worthy of further study. With no prior research to pave the way, this study set out to identify and explore the relationship between early and late adolescent career interests, as well as career exploration and interest in careers for the future.

The overriding finding of this research was that male and female career development from early to late adolescence are two separate and different processes. Although there is presently no clear theory relating to the career development of females, Rose and Elton (1973) and Zytowski (1969) have argued for a theory of career choice separate from males (Herr and Cramer, 1988). The findings of this study suggest that a theoretical perspective that focuses primarily on female career development merits further research. Such a perspective seems necessary to overcome the devaluation of the work of women that is embedded in current career development theory.

The lack of significance in almost all of the female regression models for the present study may be explained by this embedded devaluation of traditionally female occupations. As was stated previously in the limitations of this study, the DOT ratings of tasks performed in an occupation relating to data people and things are biased against traditionally female occupations, such as child care worker and teacher. Similarly Roe's field—level classification system places traditionally male occupations, such as doctor and lawyer, at level 1 (the highest), whereas traditionally female occupations, such as teacher and nurse, are at level 2, secretary is at level 3, and child care worker is at level 4.

Instead of dismissing the female models because of their lack of significance, the measures need to be evaluated in what Gilligan (1982) termed "a different voice." Measures need to be developed that accurately assess the interests, motivations, and sex-role socialization of females. As this study has indicated, while certain procedures may be useful in explaining and predicting the career interests and behaviors of males, they are insufficiently descriptive of females. To develop more accurate measures, further study of personal and environmental influences on career interests, aspirations and behaviors for females is warranted.

In the discussion that follows, the findings about career interests will be put into the context of the relevant literature. After that, the findings from the regression models will be interpreted and significant relationships among the variables will be highlighted.

CAREER INTERESTS

In general, early and late adolescent males preferred traditional male occupations in the technical and legal fields and early and late adolescent females preferred traditional female occupations in the service field. This suggests that sex-role attitudes toward careers have not changed very much since Erb (1983) found that early adolescent males showed stronger interest in high technology careers than did early adolescent females. On the other hand, he found that early adolescent females showed stronger interest in traditional areas such as service and organization than did their male counterparts. Thus, it appears that early adolescence is a period when career choices become more sex-role stereotyped and that these stereotypes are carried through to late

adolescence. Due to the lack of research literature on early adolescent career interests, it is difficult to provide any further analysis of the impact of the primary settings of family, school and peer group upon the sex-role stereotyping of early and subsequently late adolescent career interests. However, it can be inferred from the findings that parents and educators, as well as those in business and the media, need to demonstrate to early adolescents—especially females—that a broader range of career choice is possible.

Parents and educators also need to make greater efforts to motivate the youths' interests in careers. The finding that the intensity of interest in slightly more than half of the 20 occupations presented to the youths decreased significantly from 1983 to 1987 was also supported by Erb's earlier study. Erb found that most career areas suffered a decline in interest among both males and females in the initial years of early adolescence. This study found the decline to continue through to late adolescence.

Taken together, the sex-role stereotyping of careers and decreasing interest in careers from early to late adolescence suggests that male dominance of high technology and legal occupations will continue into the next century. Unless families, schools and other socializing agencies take steps to alter these trends, the disparity between males and females in these fields will grow (Erb, 1983; Vetter, 1978, 1981). It appears that females need even more encouragement to dream about careers as they seem to close out career options earlier than boys.

FIELD—LEVEL INTERESTS

The application of Roe's (1956) multidimensional system for classifying occupations according to eight fields and six levels to the MEAS data from 1983 and 1987 yielded more insight into the male—female dichotomy regarding career interests. Roe's classification system allows for an analysis of career interests in relation to the degree of responsibility, capacity and skill involved in an occupation.

The male stepwise multiple regression model for late adolescent field—level interests included one significant predictor variable, that was early adolescent field—level interests. The relationship between male EAFLI and LAFLI was positive. The female model did not include any

significant predictor variables, although place of residence did enter into the regression equation. The relationship between female POR and LAFLI was negative.

These findings are consistent with Erb's earlier work and the findings presented in the preceding section of this chapter. On the average, early adolescent males showed greater intensity of interest in more occupations across field—levels than early adolescent females. Males were more interested in occupations with high degrees of responsibility, capacity and skill and the early adolescent interests of males were significant antecedents to late adolescent interests. Again, it would seem that females perceive less choice and consequently show less interest in a variety of occupations. This was especially true of occupations in the fields of high technology, law and science, since these are the occupations that were scored the highest on the field—level classification system.

Although the relationship between late adolescent female field—level interests and place of residence was not significant, it is interesting to note that it was negative. This indicates that females in rural areas (population less than 25,000) showed greater interest in occupations with high degrees of responsibility, capacity and skill than their counterparts in urban areas (population greater the 25,000). Why this is so is unclear.

Parents' field—level and youth's chronological age were not found to be significant in either the male or female regression models. Indeed, it is argued in the literature that schools in general and teachers in particular play the greatest role in influencing adolescent career interests (Campbell & Parsons, 1972; Erb, 1981,1983; Vetter, 1978, 1981). Campbell & Parsons (1972) suggest it is because the majority of students perceive school as the major pathway to achieving their occupational goals. In their study of disadvantaged and advantaged seventh- and ninth-grade students, student responses to questions concerning "considered, preferred and planned" careers were coded according to a modified version of Roe's Classification of Occupations (1956). They found that the students' responses, regardless of social group, did not relate to the same sex parent's field or level. They concluded that "[i]n neither social group do parental occupational activities seem to provide an influential model at this stage of development" (p. 411). There is nothing in this study to support or refute these findings. It is suggested

that none of these findings preclude parental influences from playing a greater role in determining one's career interests in later life.

DATA PEOPLE, AND THINGS

Examining occupations in relation to data, people, and things offered another perspective of early and late adolescent career interests. This view brought the worker traits for a specific occupation into focus. The three hierarchies also allowed for a further refinement of late adolescent field—level interests.

The male stepwise multiple regression model for late adolescent "data" interests included one significant predictor variable, that was early adolescent field—level interests. The relationship between male EAFLI and LADI was positive. The female model did not include any significant predictor variables, although place of residence did enter into the regression equation. The relationship between female POR and LADI was negative. These findings were the same as the findings for the stepwise multiple regression model for late adolescent field—level interests. Again, it would seem that females perceive less occupational choice during adolescence. Consequently, they showed less interest in occupations with high data scores such as architect, chemist and space engineer, which are traditionally male dominated occupations.

The male stepwise multiple regression model for late adolescent "people" interests included two significant predictor variables. The variables were early adolescent field—level interests and youth's chronological age. The relationship between male EAFLI and LAPI was positive; the relationship between male AGE and LAPI was negative. No variables entered the regression for females. These findings were consistent with the preceding stepwise multiple regression models for males and females. Males showed greater interest than their female counterparts in occupations with high people scores such as doctor and lawyer, which are traditionally male dominated occupations. The relationship between AGE and LAPI for males was not unexpected as Erb (1983) reported that male preferences for all career areas declined from age 10 to age 12 or 13 and then rebound after age 14.

As was found before, the male stepwise multiple regression model for late adolescent "things" interests included early adolescent field—level interests as the lone significant predictor variable. The relationship

between male EAFLI and LATI was positive. The female model did not include any significant predictor variables, although place of residence did enter into the regression equation. The relationship between female POR and LATI was negative. These findings were consistent with all previous analyses.

Overall, early adolescent career interests are significant antecedents to late adolescent career interest for males, but not for females. It can be inferred from these findings that males are socialized from an early age towards occupations that require high levels of responsibility and skills and span a variety of fields. Such occupations tend to be prestigious and well paid, such as doctor and lawyer, and also tend to be male dominated. Females tended toward lower paying service occupations. The lone bright spot is that BLS employment projections show both percentage and numerical growth in service sector employment into the 21st century.

The goal of this research was not to devise a system to fit adolescents into specific occupations, but to examine their interests in relation to the skills they will need to meet their future objectives. In other words, to increase the career options of youths it is necessary to increase their awareness of a variety of occupations, as well as the skills necessary to achieve their possible future career choices. Females have been found to close out career choices much earlier than males. In doing so, females may be creating barriers that will be quite difficult to overcome in later life. It appears that male dominance in certain career areas, such as science, technology, and law, will continue unless females are encouraged to explore a wider variety of occupations and to attain skills beyond those required for service oriented jobs. The perceived sex-role stereotyping of careers coupled with declining career interests from early to late adolescence suggests that families, schools and other socializing agencies need to make greater efforts to demonstrate to early adolescents—males and females alike—the relevance of career interests and exploration to possible future career choices. As Super (1980) points out, failure to explore during adolescence often leads to a poor choice of an occupation or job in later life.

CAREER EXPLORATION

Careers are unique to each person and are created by what one chooses or does not choose throughout his or her life-span (Herr & Cramer, 1988). Career exploration is the active investigation and consideration of possible future career options. What an adolescent chooses or does not choose to explore in school, at home, with friends, or in the community impacts on his or her career choices in later life. It has already been demonstrated that the interests expressed during early adolescence are significant antecedents to late adolescence career interests for males. For females, it is just as important that they tend to perceive less choice and, therefore, express less interest in occupations during early adolescence. This career indifference is carried into late adolescence and possibly beyond. Thus, junior high school is not only a career choice point, but also a pivotal stage of career development.

An examination of the career exploration scale found that males were more likely than females to have spent time reading about, watching in person and on television, and trying out activities related to jobs. In other words, males were found to be more likely to explore careers than females. The implications of this are far reaching. Students who tend to cope successfully with occupational tasks as young adults exhibit antecedent occupational behaviors in junior high school (Campbell & Parsons, 1972; Super, 1976, 1984). By limiting the scope of their exploration, females may be limiting their options in later life. For adolescents from disadvantaged rural and urban areas, the problem may be nearly insurmountable. Now and into the next century, a premium will be placed on having a variety of skills to offer potential employers. Once again, disadvantaged females will face a steeper climb than their male counterparts since they are starting out further down the slope.

The male and female stepwise multiple regression models for late adolescent career exploration each included youth's chronological age as the lone significant predictor variable. In both cases the relationship was positive. This means that as the youths move through late adolescence the more likely they are to spend time exploring possible future careers. These findings are supported by the theories of Ginzberg et al. and Super. Both theories view the age span from approximately 15 to 18 years of age as transitional. At 15 or 16, the adolescent attempts to find his or her place in society. During this time, the adolescent explores

career options and synthesizes such elements as his or her capabilities, career interests, and skills. These factors are then assessed in terms of the individual's goals and values, and tentative choices regarding careers are made. At 17 or 18, the school system dictates that the adolescent must make a transition from high school to work or college.

For many adolescents, the choice of work or college was made during early adolescence. The courses they decided to take or not take, the activities in which they participated or did not participate, the after-school job they had or did not have, coupled with the people (parents, teachers, counselors, relatives, peers, business persons) they spoke with about careers or college, all determined their choices before the end of high school.

Although coping with career development tasks is a challenge for all adolescents, it is more complex and intense for disadvantaged adolescents due to cultural deprivations (Campbell & Parsons, 1972). It can also be inferred from the preceding findings of this study that career development tasks are more complex and intense for females than males, regardless of economic levels. Schools by themselves are not powerful enough to overcome the influences of the disadvantaged adolescent's home, peer group, and community (Hamilton, 1982). They are also not powerful enough to overcome the sex-role stereotyping of careers. To enable and motivate adolescents—males and females, advantaged and disadvantaged alike—the schools must be opened to the community. Hamilton (1982) suggests that doing so would create new possibilities for interaction among the settings in which adolescents develop, namely family, school and peer group.

Increasing the interaction among the primary settings through the community may provide a spark to ignite early adolescent career interest and exploration. The findings of this study suggest that early adolescent motivation towards careers carries over into late adolescence. Males have been shown to be more receptive to career motivation than females, but perhaps this is because the primary motivator up until now has been the schools. By opening the schools to influences from the other settings in which adolescents develop, the career development of females also may be stimulated in a positive manner. The effect on disadvantaged adolescents—males and females—may be positive as well. Teachers, parents, employers and community leaders would all benefit from such

interaction, for adolescents who possess educational—occupational handicaps today represent problems for the community in the future.

CAREERS FOR THE FUTURE

By 2000, 63 percent of women aged 16 or older will be in the labor force. As a result, women's share of the labor force will grow from 45 percent today to 47 percent (Crispell, 1990). Minorities will also see increases. The black share of the labor force will rise from 11 percent today to 12 percent in 2000; the Hispanic share will rise from 7 percent to 10 percent. The occupations that women, blacks and Hispanics will fill, however, are being decided now by the choices adolescents are making in and out of school.

Whether based on the percent or numerical change of employment from 1986—2000, the findings for late adolescent interest in careers for the future parallel those in the preceding sections of this chapter. Males showed greater interest in more occupations across employment growth projections than females. In addition, male interests in careers for the future were more dispersed than female interests in the same. It is interesting to note that males and females expressed the greatest interest in occupations projected by the BLS to grow at moderate to high rates whether based on percent or numerical change. Also, there was little interest expressed by either males or females in declining occupations, such as farmer or farm manager, factory worker, miner, or gas station attendant. Where adolescents get their information about growing and declining careers was beyond the scope of this study. Further study of the role of schools, parents, peers and media in this regard is needed.

For males, no variables entered the regression based on either percent or numerical change. For females, only place of residence entered the regression based on percent change, but it was not significant. Once again, the relationship between the predictor variable female POR and the criterion variable, in this case LAICF, was negative. The implications for these findings already have been discussed.

IMPLICATIONS FOR THE FUTURE

The previous discussion highlights how important sex-role stereotyping is in the development of career interests from early to late

adolescence. For the most part, females expressed little interest in non-traditional occupations, such as careers in technological, legal, or scientific fields. Although males showed greater interests in a wider variety of occupations than females, both showed declining interests from early to late adolescence. Looking into the near future, it is clear that a high school education will not be enough to secure employment in the 21st century. Without basic skills in relation to data, people, and things, many young adults will be locked out of all but the most menial of occupations.

Aside from predicting future career choices, knowing more about early adolescent career interests can help educators design programs that better fit the needs of early adolescents. Assessing early adolescent interests is an important first step in understanding their needs. It is also crucial for determining the antecedents to late adolescent career interests, exploration, and planning. Focusing on early and late adolescent career interests can provide motivation for making subject matter relevant to the needs of developing adolescents. In turn, more relevant subject matter can provide motivation to adolescents, especially females and disadvantaged youths, to explore and follow non-traditional career paths. However, as was noted earlier in this chapter, schools by themselves are not powerful enough to overcome the influences of sex-role stereotyping and cultural deprivations on adolescent career development.

The ecological perspective calls attention to the mutually reinforcing influences of the family, school, and peer group on the developing adolescent. In the single previous study of early adolescent career interests conducted by Erb (1983), only the setting of school was examined. This study attempted to obtain an ecological perspective by synthesizing findings from several analyses to produce an ecological view of the development of career interests. A similar approach was used by Hamilton (1982) in a paper on adolescent development and schooling. At present, the results seem encouraging. Insights into the complexities of career development from early to late adolescence were achieved. Career interests have been viewed in terms of inventories, field—levels, and data, people and things. Career exploration and interest in careers for the future also have been viewed. Although a Bronfenbrenner-esque approach has not been applied in a strict, traditional manner, the

analyses presented in this study taken as a whole provide an ecology of the development of career interests and present a basis for further study.

A Bronfenbrenner-esque approach was not applied in a strict, traditional manner because career development theory and a life span ecological approach do not mesh seamlessly. The seams became visible when variables derived from the career development literature were threaded through Bronfenbrenner's micro-, meso-, exo-, and macro-systems structures. Also, proclaiming a study to be ecological is easy. Developing a model that fulfills that claim is not. The implication for career development theory is that a life span ecological approach is a promising perspective that warrants continued research and development. However, future adherents to such an approach are cautioned to be less concerned with the systems terminology and to focus more on the process.

Toward the Future

There is a pressing need to motivate youths to explore occupations and envision employment in challenging and rewarding careers. There is also a critical need to create educational and employment opportunities that will motivate the disadvantaged to stay in school, avoid drugs, and postpone parenthood. It is time to break-down sex-role stereotypes and build-up career choices.

Although career development is not irreversible in early adolescence, those years are clearly significant to and have major consequences for future plans and achievement. Early adolescence is the beginning of the development of specific career interests which in turn influence career exploration and subsequent development. What is needed is more encouragement for early adolescents to imagine their educational—career futures and to invest time in exploring them. Encouragement must come from the developing adolescent's family, school and peer group if such an approach is to be successful. The purpose is not to fill the employment needs of industry, but to invest our children with the skills necessary to meet their own personalized goals. In the future, it is hoped that when asked "What do you want to be when you grow up?", boys and girls alike will answer "I can be anything I want to be."

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