EGO IDENTITY, EGOCENTRISM, AND FORMAL OPERATIONS

by

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Dissertation submitted to the Faculty of the

Virginia Polytechnic Institute and State University

in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

in

Family and Child Development

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August, 1982

Blacksburg, Virginia
ACKNOWLEDGEMENTS

I would like to express my gratitude to the members of my committee for their guidance and encouragement. However, most of all I would like to express my profound appreciation for the knowledge they have imparted to me regarding child and adolescent development as an integral dynamic of family functioning.

The humor from all committee members was greatly appreciated, especially from Dr. Hinkle regarding my expert knowledge of statistics and Dr. Protinsky regarding my in-depth understanding of theory.

I would like to again express my gratefulness to the Roanoke County School System, the students who participated, and the parents who gave permission. A special thanks to the raters who collected my data for their determination and tenacity.

A special thanks goes to my family for enduring the trials and tribulations and especially to my husband who still declares that academia is trivia but who pursued with me, insisting that knowledge gained is invaluable when applied in understanding and ameliorating the stress of others.
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CHAPTER I
INTRODUCTION

Adolescent behavior has been a matter of concern to parents, educators, and psychologists for many years (Wadsworth, 1971). The deep and sustained interest in young people is portrayed by the voluminous amount of recent research discussing the adolescent phenomena. Although numerous theories exist, many questions and much controversy abounds regarding the unique characteristics of the adolescent period (Muuss, 1975). Even the definition of the period itself is rather vague. Most theorists agree that the beginnings of adolescence depend upon the onset of the physiological changes of puberty. However, the termination of adolescence is highly variable and non-specific (Marcia, 1980). The adolescents in present-day society are characterized by a search for identity. An increasing number of young people appear seriously confused as to whom they would like to identify with, what they would like to become, and how they might make a positive contribution to society. In terms of social malaise, the problem of enabling youth to make an effective transition into adulthood is of major concern (Rachman, 1975).

Two major theories lending understanding to the adolescent process involve the young person's psychosocial development and his cognitive progression. Erik Erikson's (1950, 1959, 1968) psychosocial theory of human development emphasizes the concept of identity as the underlying theme involving changes in personality from birth to death. Erikson
expanded and elaborated the sexual nature of man as proposed by Freud's psychoanalytic theory into a psychosocial theory which presents the nature of man as a biological, psychological, and social being. Human development, according to Erikson, proceeds according to a ground plan with each stage receiving a special emphasis in the progression toward a functional whole.

The identity crisis is the most prevalent characteristic of the adolescent period (Muuss, 1975). It is during the somewhat turbulent years of adolescence that attitudes about how one feels about self and perceives self in relation to others are formed. The successful resolution of the identity crisis involves a recognition of the self as unique and as a productive member of society with some direction as to future goals and aspirations (Rachman, 1975). Research conducted among adolescents regarding ego identity has included many variables which can mostly be grouped under the broad headings of cognition, personality, and personal development.

It is important to consider that as the identity crisis of adolescence is being resolved different cognitive changes are occurring. As cognitive structures change, the emotional and social development of the young person is enhanced. The ability to think hypothetically allows for consideration of alternatives regarding social ideologies, new awareness of the thoughts and feelings of others, and the ability to consider more objectively the future and the role one might like to assume. This cognitive progression allows for a more complete and meaningful understanding of society and the potential it has to offer.
The occurrence of a transition in cognitive tasks, from concrete to formal operations, and a transition in ego identity, from other's hopes and expectations to one's own ambitions and goals in life allows for the unique potential of each individual to develop.

The cognitive development approach in explaining adolescence is most typically associated with the writings of Jean Piaget. The main issue addressed in Piaget's work is the nature of the individual's knowledge, the type of thinking involved, and how it is applied in the intellectual process. The quality and mode of thought are the subjects for analysis in the Piagetian model. It is especially the change in the thinking process that a person exhibits throughout his lifetime that becomes the focal point in cognitive development theory. Piaget was concerned with knowledge and its development from a conceptual and empirical viewpoint (Lerner and Spanier, 1980).

As a child grows and matures, his mind becomes increasingly active and alert. The adolescent gains the ability to engage in abstract thinking and to hypothesize and arrive at logical solutions considering all possibilities. Piaget refers to this hypothetical-deductive reasoning process as formal operations (Pulaski, 1971). The adolescent can think beyond the present and can form propositions around many alternatives. At the same time, the adolescent can reflect about his own thinking, even though his theories may be oversimplifications of reality (Inhelder and Piaget, 1958).

Piaget's ideas concerning a stage of formal operations with logical thought as its principal variable have become very influential and have generated the bulk of research in the area of cognitive
development (Keating, 1980). Research conducted among adolescents in regard to formal operations has been concerned with variables such as age or stage progressions, intelligence, cultural differences, language necessities, moral development, interests, and memory.

Neimark (1975a) in surveying the status of research regarding adolescent cognitions found a paucity of information, limited generality of the little information available, and a complete deficit in relating cognitive development to other developmental changes which mark the adolescent period. The advances in cognitive skills have a profound affect upon other aspects of the young person's life. On a personal level, adolescence is a time of intense personal relationships. Cognitive progression allows more awareness of self and others in personal interaction. The world of the adolescent becomes qualitatively different from the world of the child from an emotional and social, as well as from an intellectual standpoint (Neimark, 1975a). The child becomes stimulated by his new social involvement and challenged by his environment in determining his unique and special identity and how it can be incorporated into an on-going society (Gallatin, 1975).

The interpretations and elaborations of Piagetian theory by David Elkind regarding egocentrism have been very valuable in gaining a more complete understanding of adolescent behavior. Elkind (1967) defines adolescent egocentrism as the failure to differentiate between the cognitive concerns of others and those of self and states that by studying egocentrism it may be possible to bridge the gap between cognitive structures and personality dynamics.
Adolescent egocentrism, emerging at about age 11 or 12, includes the capability of forming thoughts about one's own thoughts as well as thinking about others' thoughts. The adolescent becomes overly involved with the ability to think in a new manner and becomes preoccupied in thinking about self and thoughts and does not distinguish what he is thinking from what others are thinking. The adolescent may even reach a point in which he convinces himself that he knows exactly what others are thinking. The adolescent considers everyone to be as possessed with thinking of self as he is and, in not discriminating his thoughts from others, becomes extremely self-conscious.

The adolescent, although he has gained tremendously in cognitive abilities, is still growing and beginning to think about the future. To his present youthful activities, the young person begins to add an adult agenda and begins to consider adult roles. Not only does the adolescent prepare himself for society but he attempts to alter society to meet his own needs as seen from his egocentric stance (Elkind, 1967). In his egocentric pattern the adolescent often loses sight of the viewpoint of others or of the group in society which he wishes to transform (Lerner and Spanier, 1980). This centering process accounts for much of the exuberant idealism seen in young adolescents. This naive idealism involves unrealistic proposals and a disregard for the obstacles included (Inhelder and Piaget, 1958). It naturally follows that as formal reasoning increases and egocentrism decreases, the young person can more realistically assess his relationship with other people and the options available in
realizing his potential as an individual and thereby establish a healthy, stable ego identity.

Justification

A number of authors (Flavell, 1963; Kohlberg and Gilligan, 1971; Reese and Overton, 1971) suggested several years ago that an understanding of Piaget's concepts, coupled with psychosocial theory, would result in considerable knowledge regarding the nature of adolescence. This suggestion seems likely since both theories share striking points of view in common. Both approaches emphasize biologically-based systems which evolve into a more complex whole, and both theories stress the importance of an adaptive relationship between the individual and his social environment (Wagner, 1976). Both theorists present an optimistic view in which man is seen as a controlling agent over his destiny as he becomes increasingly autonomous. The concepts of Piaget and Erikson, although differing in their developmental focus, are basically complementary and offer a powerful understanding of human growth. A better understanding of the relationship between cognitions and ego development would result in a greater sensitivity to individual developmental differences in adolescents (Miller, 1978).

The challenge for further research relating cognitive and psychosocial theory has been accepted by Berzonsky, et al. (1975), Cauble (1976), Wagner (1976), Afrifah (1980), and Marcia and Rowe (1980). However, these researchers had problems relating ego identity to formal operations. Berzonsky, et al. (1975), Cauble (1976), and
Afrifah (1980) found no relationship between identity and formal operations among her 17-18 year olds. Marcia (1980) stated that the research has involved methodological problems and suggested that the hypothesis to be considered in future research is that formal operations are necessary for ego identity to be achieved. Marcia and Rowe (1980) found support for the hypothesis that formal operations would be a necessary but not sufficient condition for the development of an identity achievement status but the authors stated that since there were only 26 subjects in their sample that a definitive confirmation or disconfirmation of the hypothesis was not possible. The authors suggested further research in the area of cognition and identity with a larger sample. Also, in speaking to the issue of identity, they suggested that something must occur to "catalyze" cognitive development into psychosocial development and that a likely area to direct research would be in discovering what this catalyst might be.

Along the line of such a catalyst, Elkind (1967) stated that an understanding of egocentrism as part of formal operations would prove useful in any attempt to reconcile cognitive aspects and personality dynamics. A synthesis of cognition and ego identity has also been proposed by Adams (1976). He stated that the modification of ego identity formation is paralleled by changes in cognitive thought and egocentrism. Adams recognized that at first glance egocentrism and Erikson's psychosocial crises seemed so entirely different that any integration of the two theories would seem questionable but concluded that possibly the cognitive component of new-found realities emerging
from adolescent egocentrism allows the young person to attain the potential of self as a distinct person as described by Erikson. In reviewing the literature regarding ego identity, Adams (1976) concluded that the commitment necessary for completion of the ego identity process would require the abstract thinking of formal operations and the ability of the adolescent to differentiate his feelings from others as accomplished in the decentering of egocentrism. Thus, Adams was suggesting a theoretical link between formal operations, egocentrism and ego identity. To more fully understand the maturational sequences between formal operations, egocentrism, and ego identity, Figure 1 has been prepared to illustrate the parallelism of the three theories.

Purpose

The purpose of this research is to determine the relationship between ego identity, formal operations, and egocentrism in an adolescent population. The variables of age and sex will also be considered as they relate to formal operations, egocentrism, and ego identity.

Theoretical Framework

The theoretical framework will contain the ego identity theory formulated by Erik Erikson and the cognitive development theory proposed by Jean Piaget. Also included in the theoretical framework will be an elaboration of Piaget's concepts in the area of egocentrism as expressed by David Elkind.
### Cognition

**Sensorimotor (0–2 years)** - Exercising inborn reflexes, centered at first on body, attainment of object permanence, beginnings of intention, experiments to discover new properties of objects. Can use one object to attain another. From the beginning, acts of assimilation and accommodation are present. Child invents behaviors to attain ends.

**Preoperational (2–6 years)** - Child becomes less dependent on direct sensori-motor action. Flourishing of representational thought, symbolic substitutes of language and images, symbolic play and imitation predominate.

**Concrete Operational (7–11 years)** - Thought becomes reversible, skills of classification, seriation and conservation attained, abstractions dependent upon specifics of objects and events. Child has ability to make judgments regarding truth and falsehood, fantasy and reality.

**Formal Operations (Adolescence)** - Hypothetical-deductive reasoning process emerges, pure abstractions, ability to consider all possible propositions while holding specific variables constant, follows logic while ignoring content.

### Egocentrism

**Egocentrism (0–2 years)** - Conquest of Object Attention drawn from self to environment, conquest of the object, actions are repetitive and self-reinforcing. In early months there is a lack of differentiation between object and sense impressions of object–once object permanence is established the earliest manifestations of symbolic play begin to form.

**Egocentrism (2–6 years)** - Conquest of Symbol Symbolic function fully active–inability to separate symbol from its object, pretense becomes reality. Child assumes words carry much more information than they actually do.

**Egocentrism (7–11 years)** - Conquest of Assumptions Treats hypotheses as facts called "assumptive realities." Language becomes more socio-centered. Child assumes adults aren't too bright-referred to as "cognitive conceit"–later begins to act on a more concrete practical level.

**Egocentrism (Adolescence)** - Conquest of Thought Conceptualizes thoughts of others, self-focus and focus of others confused during early adolescence, imaginary audience and personal fable predominate, eventually de-centering allows differentiation of self thoughts from others' thoughts, integration of one's own ideas emerge.

### Ego Identity

**Basic Trust vs. Mistrust (0–1 years)** - Task involves trustworthiness of self and others, consistency in care-taking needs important, self-confidence and predictability.

**Autonomy vs. Shame/Doubt (1–2 years)** - Task involves becoming an independent person, child exerts will, self-assurance and creativity become important issues.

**Initiative vs. Guilt (3½-5 years)** - Task involves purposiveness and goal directedness, curiosity and exploratory behavior at peak, parent-child relationships important to sexual identity.

**Industry vs. Inferiority (6–11 years)** - Task involves a sense of duty and pride in accomplishments, identification with peers and cooperation becomes an issue, a sense of success is necessary. Parents, teachers, and age mates are significant others. Feeling of adequacy important.

**Identity vs. Role Diffusion (Adolescence)** - Task involves ego identity formation, self-perception in a social sense, especially regarding consistency in relationships and congruity with past. The decision-making process is important as goals, values, and life philosophies are being formed.

![Figure 1. Stages of Cognitive Development, Egocentrism, and Ego Identity](image-url)
**Erikson's Psychosocial Theory**

Erik Erikson has been the most influential theorist regarding identity in the past two decades (Marcia, 1980). The psychosocial theory of Erikson describes personality as a progression of stages involving changes throughout the life cycle (Erikson, 1959). Erikson's "Eight Stages of Man" concentrated on the individual as a unique entity. This expansive view of man's development offers a significant contribution to the knowledge of human behavior. Erikson's theory can be classified as "organic" in that it emphasizes the adaptive and creative aspects of man according to the variety of experiences and influences which gradually organize and build up the personality (Gallatin, 1975).

**Erikson's Theory of Ego Development**

According to Erikson (1968), personality is the integration of three systems which operate simultaneously and interdependent of each other. The three systems, biological, social, and individual, are inseparable and cannot exist alone. The biological system consists of drives and impulses which are invested in the newborn infant. Erikson considers the biological system to develop in a fairly predictable sequence according to an innate maturational factor. Erikson places special emphasis on the necessity for order and continuity in the development of the biological system especially in meeting the needs of the developing child.

As an individual does not develop in vacuo but is constantly being influenced by his environment the social system also plays an
integral part in personality development. It is in the presence of other people that the drives and instincts are satisfied and maintained and the unique potential of each child is manifested. Because of the great helplessness and dependency of the human infant, even the child's very survival is dependent upon those around him. The social system involves a mutual accommodation of family and child and varies from culture to culture (Erikson, 1968).

The individual system involves the peculiar idiosyncracies of each person. Each child is born with different needs and abilities, and responds in a unique fashion to his environment. The behavior is cyclical as others in society perceive and respond to each child in a special and unique fashion (Gallatin, 1975). In a broader sense, during the life span the developing individual makes demands upon society and society responds with caretakers and institutions in attempting to enable the individual to adapt to demands and rewards of that life phase. Marcia (1976a) emphasizes that society and the individual create a unity within which mutual regulation takes place. In summary, Erikson considers biological, societal, and individual aspects as tantamount in development of the personality (Erikson, 1959).

**Stages of Development**

Each of the eight stages of development described by Erikson presents a conflict, a psychosocial crisis or crucial moment which the individual must successfully resolve before progressing to the next stage of development (Rachman, 1975). As seen on the diagonal
axis (Squares I-VIII), in Figure 2 (Gallatin, 1975, p. 197), each crisis represents a unique challenge during specified times of life (Rachman, 1975). Successful resolution of all eight stages of development results in a healthy and cohesive adult personality (Erikson, 1956). On the epigenetic chart, the vertical axis (Squares 5-V) represents the different aspects of the identity crisis as experienced by the adolescent. The horizontal axis (Line V) portrays the adolescent identity crisis in relation to the other normative crises. If the conflict resolution is inadequate in previous stages, the individual may arrive at the adolescent period of life with feelings of loneliness, self-doubt, inhibitions, or futility which may possibly prevent the establishment of a healthy, stable, ego identity (Gallatin, 1975). Since a strong, healthy ego identity is dependent upon the outcome of previous stages, the epigenetic principle demonstrates how each of the four stages preceding adolescence contributes significantly to the development of the ego identity at adolescence (Muuss, 1975). A brief summary of the outcomes of previous stages and how they affect the developing ego identity will be presented.

Trust vs. Mistrust (Infancy). During the first stage of development the basic issue involves becoming a trusting or mistrusting person. Trustworthiness involves trust in self as well as others and is formed in the mother-child relationship as the mother takes care of the child regularly. If basic needs are not satisfied on a regular basis the child does not trust himself or see himself as secure or
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**Figure 2.**
living in a predictable world and may come to be suspicious and fearful of people in general (Erikson, 1968).

**Autonomy vs. Shame/Doubt** (2nd Year). The second stage of development involves experiences regarding autonomy and free choice. The issues involve becoming a creative, autonomous individual or an inhibited, fearful, and dependent person. The child begins to experience himself as an entity and begins exerting his own will and developing some measure of self-control. With proper training the child learns a sense of mastery over tasks, self-confidence, and self-assurance. Negative outcomes can result in low self-esteem, shame and self-consciousness (Erikson, 1968).

**Initiative vs. Guilt** (Age 3½-5). The third stage of development occurs during the preschool years. The conflict during this stage involves activity, curiosity, and exploratory behavior or being immobilized by fear and guilt. The child's area of exploration increases and his language develops rapidly. There is also an increased awareness and curiosity regarding the child's body. Successful resolution of this stage results in ambition and goal directedness. Negative resolution leads to inhibition because of fear and guilt and may lead to dependence upon adults (Erikson, 1968).

**Industry vs. Inferiority** (Age 6-11). The fourth stage of development occurs between school entry and puberty and involves a desire to do well in work. If the conflict is mastered successfully, the child learns to accomplish tasks and gain recognition from others. Negative outcome during this stage involves a feeling of uselessness and a sense of futility (Erikson, 1968).
Ego Identity of Adolescence

The psychosocial task of the adolescent period is ego identity formation. Ego identity, as used by Erikson, refers to the successful outcome of ego development and is hypothesized to occur during adolescence. Erikson (1968) defines ego identity as a certain unity of personality involving the individual's interaction with his environment and the ability to perceive self and society correctly. Erikson (1968) also describes identity formation as a process of increasing differentiation which becomes more inclusive as the individual grows older and becomes more aware of other individuals in society that become significant to him. Ego identity includes an inner organization of needs and abilities and self-perception in a social sense (Marcia, 1976). The term ego identity implies a relationship between how a person thinks and feels about himself and how others think and feel about him (Alissi, 1972). It implies a consistent sameness with oneself and a consistent sharing with others (Erikson, 1959). The identity process does not begin or end with adolescence. The beginnings of identity most likely occur during early childhood when the young child distinguishes between self and objects and identity continues to be developed throughout its final phase in old age (Marcia, 1980). Erikson (1968) states that ego identity is never final or static but is constantly revised according to the perception of self as part of social reality.

If the individual arrives at the adolescent stage with a sense of trust, autonomy, initiative, and industry, chances are increased that he will develop a clear sense of ego identity (Tosi, 1974).
Previous conflict resolutions may not have been absolutely perfect, but must have been predominantly positive for future growth to occur (Rachman, 1975).

**Recapitulation Process**

Erikson states that anything that grows has a ground plan and that each aspect of the ground plan, with its special emphasis, moves toward and affects the development of the functional whole (Erikson, 1968). It is imperative to note that the adolescent crisis stage contains a recapitulation process as it awakens issues and feelings included in the previous stage of development (Protinsky, 1975). The conflict that occurs in previous stages has two possible outcomes. If the conflict is resolved mostly satisfactorily, a positive quality is built into the ego. If the conflict is resolved mostly unsatisfactorily, a negative quality is incorporated into personality development and interferes with future growth (Muuss, 1975). The identity crisis is most pronounced during adolescence and is affected by crisis resolution of previous stages.

**Influence of Previous Stages on Ego Identity Formation**

The horizontal axis in Figure 2 demonstrates how the resolution of previous stages affects adolescent identity formation. During adolescence, many issues are dealt with simultaneously, but it will be more useful to examine each issue separately.

**Temporal Perspective vs. Time Confusion**. In gaining some direction for the future, it is imperative that the adolescent examine past experiences and evaluate present goals in order to effectively
realize full potential. This involves being aware of alternatives in achieving goals and grasping opportunities as they arrive. The adolescent who did not successfully resolve the crisis of the Trust vs. Mistrust stage and is lacking trust in self and others may not recognize needs or may not feel enough self-confidence to attempt to meet these needs (Erikson, 1968).

**Self-certainty vs. Self-consciousness.** As the adolescent examines his assets and liabilities he may become painfully self-conscious of this past and fearful of the future. A positive outcome of the crisis experienced in the Autonomy vs. Shame/Self-doubt involves pride in self and the self-certainty to be whatever one chooses to be. The negative outcome may result in self-consciousness which negates action and encourages compliance with others and looking to others for feelings of self-worth (Erikson, 1968).

**Role Experimentation vs. Role Fixation.** In assuming an adult role in society it is necessary for the adolescent to envision many alternatives and try out different roles before settling in a certain niche. The mastery of the crisis during the Initiative vs. Guilt stage results in ambition and experimentation with different roles during adolescence. A negative outcome of the third stage of life can result in role fixation and a dependency on others as guilt produces bewilderment in accepting responsibility (Erikson, 1968).

**Apprenticeship vs. Work Paralysis.** The adolescent is faced with many choices having to do with work. The adolescent who has successfully resolved the conflict during the fourth stage of development, Industry vs. Inferiority, will experience a sense of duty to self and
others and feel a need for accomplishment in workmanship and an industriousness that leads to success. Negative outcomes may result in feelings of restlessness, futility, and may cause work-paralysis (Erikson, 1968).

**Sexual Polarization vs. Bisexual Confusion.** It is during young adulthood that most people establish intimate relations with individuals of the opposite sex. For the adolescent this means defining and redefining what it means to be male or female. In assuming a sexual role, an adolescent may become unsure of himself or herself and engage in sexual activities at an early age or withdraw from any sexual encounter (Erikson, 1968).

**Leadership and Fellowship vs. Authority Confusion.** As the adolescent broadens his social circle and becomes involved in new activities the foundation regarding how he will view the contribution he can make to society during the middle years is forming. Leadership roles in job and community as well as fellowship when necessary become an integral part of adult life for the adolescent who has considered and experimented with different roles and considered success as important to his well being. As there are many pressures exerted on the adolescent regarding job and ideology, authority confusion may result which negates the adolescent formulating his own personal ambitions (Erikson, 1968).

**Ideological Commitment vs. Confusion of Values.** The adult at some point considers himself in a social context and brings his past and present together with future aspirations to judge the compatibility of his assumed positions with certain goals and desires. The adoles-
cent who sees his ambitions in line with his present activities senses a feeling of ideological commitment and at the same time views his life as meeting the expectations of a larger society (Erikson, 1968).

**Identity Diffusion**

The psychological danger of the adolescent period is identity diffusion (Erikson, 1950) which involves a sense of fragmentation and looking to others for identity (Erikson, 1959). The diffused adolescent may not have relinquished parents as psychosexual objects, childhood ideology of being a "taker", or fantasies of glamorous lifestyles. Some young people cannot give up the certainties of childhood for the uncertainty of the future (Marcia, 1980). The diffused adolescent may not know exactly who he is from day to day, where he is going, or that he can control drives and make appropriate decisions (Erikson, 1959).

Identity formation does not occur in an instantaneous fashion. The formation of the identity usually proceeds in a gradual and non-conscious manner (Marcia, 1980). Those most likely to experience identity diffusion would be those who encountered difficulties in previous stages and failed to successfully resolve conflicts in progressing through the various stages (Erikson, 1956).

**Identity Foreclosure**

Since each of the four previous stages has an impact upon the adolescent identity crisis, if the experiences and traumas of the previous stages are devastating enough and the conflicts are not
adequately resolved, the identity may become foreclosed. This fore-
closure denies the adolescent the ability to carry through in the
complex process of integrating his own identity. Since there is no
conscious sense of personal uniqueness, the identity may become
permanently foreclosed and the adolescent may never formulate a
personal philosophy of life that will allow him to make his own
choices and realize his own goals. The adopted ideology of another
person will prevent realization of personal potential, perhaps for
a life time (Erikson, 1968).

Identity Moratorium

Erikson (1968) refers to moratorium as similar to a time-out for
the adolescent. During this time it is possible for the adolescent to
experiment with different roles and to delay adult commitments. Erik-
son sees this period of delay as a healthy experience for the adolescent
who is not ready to accept the challenges and expectations of society.
Erikson also defines the period as "provocative playfulness" on the
part of the adolescent and states that it leads to a deep commitment
regarding goals and values in later life.

Adolescence as Pivotal

Adolescence occupies a pivotal position in the psychosocial stage
of development for several reasons. It is during the adolescent stage
that the most work is done on the identity issue. The biological
system urges the adolescent into interaction with members of the
opposite sex and a larger arena of people, while the social system
petitions the individual to reconsider himself, not so much as the
one taken care of, but as the one who will probably assume a caretaker role in society. The adolescent responds to these promptings with a new social awareness with himself in a never-before-thought-of context (Marcia, 1976a). It also becomes more clear to the adolescent that he has a distinctive past and that he can envision a unique future for himself (Gallatin, 1975).

**Summarizing**

In summary, adolescent identity formation involves past identifications, demands of present-day society, and future aspirations. In defining who they are, adolescents must consider the reciprocal relationship between self and others, roles and expectations of society, as well as individual hopes for the future. The imminent task of adolescence is to maintain a feeling of continuity with self while establishing a symbiotic relationship with society (Newman and Newman, 1978).

**Piaget's Theory of Cognitive Development**

There is probably no one individual who has contributed more to the understanding of intellectual growth and development than Jean Piaget. Much of his doctrine has revolutionized the assumptions regarding children's behavior (Elkind, 1967). Piaget's ability to empathize with children, coupled with his great intellectual genius, made him outstanding in the field of child psychology (Elkind, 1975). The theory of Jean Piaget has become almost synonymous with the study of cognitions, especially in adolescents. The theory itself is com-
plicated as it is divided into stages and substages with concepts which cut across all stages. Piaget sees the last stage of cognitive development as the one associated with adolescence. In order to understand the thought process of the adolescent period, it is necessary to understand the character of thought possessed in the three previous stages (Lerner and Spanier, 1980).

Piaget emphasizes that cognitive development progresses through phases. This proposal is cast in the form of a stage development theory in which all individuals pass through the same universal levels of progression. The only possible individual difference would be the rate at which one passes through the stages and the final level reached. No stage may be skipped or reordered. The different stages occur in a regular, continuous sequence with each stage emerging from the previous one and becoming hierarchally integrated with previous stages (Inhelder and Piaget, 1958).

A brief overview of the cognitive developmental stages prior to adolescence will be presented. Piaget proposes that mentality in infancy up to the adolescent stage occurs in three distinct stages: the sensorimotor stage, the preoperational stage, and the stage of concrete operations.

**The Sensorimotor Stage.** According to Piaget (1952), the infant is constantly receiving stimuli through the various senses and assimilating the information from the physical world. The child gradually accommodates to what he has taken in through his senses. By means of assimilation and accommodation the child builds up schemas, or repeated patterns of meaningful responses. Through these experiences
the child begins to coordinate what he has seen, heard, and felt. The child also comes to realize that objects exist even though he cannot physically touch or see them and the child will begin to search for the object. This concept of object permanence is a milestone as it marks the beginnings of intentional behavior.

The Preoperational Stage. Piaget (1967) designates this stage as occurring approximately between the ages of two and seven and considers speech as the most important advance as the child begins to deal with symbols in the environment. The child begins to exchange ideas and to organize his own experiences and to catalog them. The child learns to think in verbal concepts and the imagination becomes very pronounced and may become indistinguishable from reality for the child.

The Stage of Concrete Operations. Operations is used by Piaget to refer to reversible mental transformations. Concrete refers to the fact that the thought process are still dependent upon specifics of the events and objects to which they relate. Piaget views this cognitive progression as occurring between the ages of seven to approximately eleven or twelve. The intellectual horizons of the school age child are increased as the child begins to gain the mental operations of classification, seriation, and conservation. The pre-adolescent begins to order thoughts and gains in the ability to take another person's point of view. The child deliberates his thoughts as the construction of logic begins (Piaget, 1967).
Formal Operational Period

The fourth and last stage of cognitive development is termed the formal operational stage. This stage appears in early adolescence (eleven or twelve years of age) and continues for a lifetime (Piaget, 1972). At the present time, Piaget's theoretical description is the only model available regarding the nature and organization of the adolescent thought processes. Piaget presents a specific account of the development of cognition during adolescence which he supports by extensive empirical research (Neimark, 1975a).

The emphasis during this stage is on the hypothetical thought process. Formal operations, like concrete operations, are reversible mental processes but represent a higher level of abstraction and generality than concrete operations. The elements of formal operational thinking involve propositions in the form of pure abstractions in the sense that the thought process is no longer dependent upon the evidence of experience. Adolescents slowly gain the capability of isolating certain variables in order to test hypotheses as they proceed from the possible to the real. This kind of hypothetico-deductive reasoning has its origin in the form of propositions rather than in the content. This intellectual operation to the second order allows the young person to follow the logic of reasoning while ignoring the actual message of each proposition (Inhelder and Piaget, 1958).

The adolescent in formal operations is thinking about his own thought in a reflective way. Formal operations allow the young person to combine propositions and to isolate variables to arrive at
acceptance or rejection of hypotheses. The conclusion is not dependent upon empirical content of the propositions (Inhelder and Piaget, 1958). For example, in determining which objects from a variety of objects float on water, a concrete operational child would want to place each object in water to see if it would float. However, an adolescent in formal operations would draw logically from the truth values of all propositions logically relating to the major hypotheses and through the deductive reasoning process arrive at a conclusion. The adolescent in formal operations when asked if certain objects float on water would cognitively consider the weight of the object in relationship to the weight of the water it displaces and arrive at a conclusion without actually manipulating the objects.

The adolescent becomes concerned with translating the possibilities and combinations of possibilities into a rewarding and acceptable reality. The operational schemata which allows for transportation of the problem into its logical forms is referred to as the INCR group which represents the thought processes of identity, negation, correlative, and reciprocal transformations. The adolescent can deal with the problem by recognition of the special attributes of the problem (identity,) cancelling out the existence of the problem (negation), relating it to other problems (correlation) or considering the opposite of the problem (reciprocation). It is the possession of the cognitive structure involving the INCR group that allows for dealing with pure abstractions with all propositions considered (Lerner and Spanier, 1980).
Inhelder and Piaget (1958) offer an example of how the INCR group affects the thought process. In considering the balance scale experiment, a child is presented with a balance with the arms marked off in equal-unit intervals and a number of unit weights. The experimenter tips the balance and the child is asked to return it to equilibrium and tell why the solution worked. In considering identity both the weight and distance could be increased simultaneously so that the basic relationship remained unchanged. This is also called the null transformation as no actual change occurs. In negation, the weight could be increased while decreasing the distance and vice versa. In reciprocation, both the distance and weight on one arm would be increased. Piaget refers to correlation as the inversion of the reciprocal. In the balance experiment, it would mean increasing weight and distance on the other arm of the balance.

Another operational schemata of formal operations consists of propositional combinations. The adolescent can make combinatorial logic in several ways: 1) Conjunction - both A and B, 2) Disjunction - A or B, 3) Implication - if A, then B, 4) Incompatibility - if A, then not B. An example of combining by conjunction would be the child explaining that both weight and distance affect the balance scale. Combining by disjunction would occur if the subjects moved weights on one arm, but not the other. Combining by implication would be the child explaining that if the weight is moved in a certain direction, then equilibrium occurs. Combining by incompatibility would occur as the subjects realizes that if the weights are moved in the wrong
Piaget and Inhelder (1958) divide formal operations into two subgroups, labeled III-A (11-12 to 14-15) and III-B (14-15 onward). Substage III-A appears to be a preparatory stage in which the adolescent can make new discoveries by applying his new found logic, but the approach is cumbersome and often not systematic. Apparently a restructuring and disequilibrium leads to substage III-B in which the adolescent can reason out the whole range of combinations of possibilities and give rigorous proofs for his deductions. Muuss (1975) gives an example of the difference in thinking in Substage III-A and Substage III-B. The subject in Substage III-A responds to the objects floating on water as doing so because they are lighter than water. The Substage III-B subjects considers the weight of the object in relation to the weight of the water it replaces. The adolescent in Substage III-B has mastered formal operations and can consider all logical possibilities and eliminate them with reasoning, based on systematically and cognitively verifying one variable at a time while all other variables are held constant. This process is referred to as formal, scientific, logical thinking (Muuss, 1975).

Interpretation of Piaget's Concept of Egocentrism by David Elkind

Egocentrism, in the strictest sense, according to the Piagetian model, implies a lack of differentiation of subject-object interaction. More loosely the term egocentrism is used to refer to the fact that the child is not aware of anything outside himself and is unable to take another person's point of view.
It would seem natural to expect egocentrism to decline in thoughts and actions as a result of socialization as a child grows older. However, egocentrism is the constant companion of intellectual development. It is a by-product of each stage and can be seen re-appearing in a unique form and expressed in unique fashion as a child progresses through the stages of cognitive development (Wadsworth, 1971). Often to the dismay of adults, as a child experiences new levels of intellectual functioning, he also experiences new outbursts of egocentrism (Piaget and Inhelder, 1958). Developmentally, egocentrism can be viewed as a negative by product of emerging mental growth such that as the child is freed from the egocentrism of one stage he becomes ensnared in the egocentrism of the next stage (Elkind, 1967).

David Elkind points out the usefulness of egocentrism as a tool in understanding the affective behaviors which are characteristic of each stage of mental development. Egocentrism as a concept is especially helpful in interpreting adolescent reactions. Elkind states that his concepts are speculative in that they are based upon clinical experiences but also empirical as he has done research in the area of egocentrism. Elkind also emphasizes that his concepts are not the final word but aid in illustrating the relationship between the cognitive structures on the one hand and the behavior characteristics on the other hand (Elkind, 1967).

The Piagetian task of conquest of thought is stressed by Elkind. Formal operations as it allows the young person to conceptualize his thoughts and to reason about them also allows for the capacity to
conceptualize the thoughts of others. Conceptualizing other's thoughts creates the crux of adolescent egocentrism. The adolescent, in cognizing the thoughts of others, fails to differentiate between his own thoughts and the thoughts of others and fails to differentiate between the objects which are of his own focus from the focus of others. Therefore, the adolescent assumes that others are as focused on himself as he is and think the same things he does. This belief that all attention is centered upon his appearance and behavior constitutes the major part of adolescent egocentrism and affects behaviors accordingly.

Two behaviors resulting from this self-focus are the imaginary audience and personal fable. Elkind refers to the premise of the young person that others are as admiring or as critical of him as he is of himself as the "imaginary audience" (Elkind, 1967, 1978a, 1978b, 1979). The imaginary audience is more a product of the adolescent's own cognitions than it is of reality. Thereby, the perception of self and others in a social context becomes distorted (Enright, Lapsby, Shukla, 1979). The anticipations young people have of the imaginary audience cause them to continually construct the audience in their minds and react to it effectively and accounts for much of the typical adolescent behaviors and responses. The imaginary audience leads to much self-consciousness and even awkwardness as the youth thinks that other's thoughts are focused on him. The adolescent wish for privacy and the hesitancy to reveal his innermost thoughts and feelings may arise from this idea of being constantly scrutinized. Although the adolescent is at times very self-critical, he is at other times very
admiring and sees his audiences as being admiring of him also. This may account for some of the outlandish, boorish fads of young people, as well as the time spent in front of the mirror concerned with looks. Often accompanying the imaginary audience syndrome is the fantasy of what others would do and say upon the death of the adolescent. It is not uncommon for a young person to engage in a Tom Sawyer-like vision of watching others at his own funeral (Elkind, 1967).

The complement of the imaginary audience is a mental phenomenon experienced by adolescents and referred to by Elkind as the "personal fable". While the adolescent fails to differentiate his thoughts from the thoughts of others, he overdifferentiates his thoughts regarding himself (Elkind, 1967). He thinks that since everyone's attention is always on him, he must be very unique, and special (Enright, Lapsley, and Shukla, 1979). The adolescent thinks that only he experiences a certain situation and to a certain degree and that no one has ever experienced the same thing before. Part of the personal fable is the belief the adolescent holds of being so unique that things that happen to others will never happen to him. This involves such things as pregnancy, drug addiction, car accidents, and death. This complex belief in immortality has been labeled the personal fable because it is a story the youth tells himself but it is not true. Evidence of the personal fable can often be found in diaries kept by adolescents (Elkind, 1967).

In summary egocentrism, according to Elkind (1967) is a stage development construct and involves an embeddedness in one's own thoughts and viewpoints. The adolescent finds it difficult to dif-
ferentiate between his own concerns and the concerns of others and becomes overly concerned with other people's thoughts. Eventually the adolescent acquires the ability to differentiate between his own cognitions and those of others. The developmental process by which differentiation occurs is known as decentering. The decentering process apparently occurs in conjunction with the adolescent's interaction with his social world. It is in social experiences and exchanges that the young person comes to differentiate between his own preoccupation and those of others which allows for a new found integration of one's own ideas (Adams, 1976).

**Formal Operations, Egocentrism and Ego Identity**

While Piagetian theory is concerned with the structural changes that take place in the thought process, Eriksonian theory emphasizes socio-affective changes in thought content. For Piaget, the adolescent period is marked by formal operations. For Erikson, ego identity is the crisis of the adolescent period (Wagner, 1976). "At a round table discussion in Geneva, Piaget and Erikson acknowledged the mutual compatibility of their work" (Miller, 1978, p. 237). Piaget (1972) has spoken directly to the issue regarding an assumed relationship between adolescent cognitive development and psychosocial progression. He stated that cognitive structural transformation is like the center or hub from which other more visible behavior changes radiate. The young person's capacity to participate in adult society and construct theories regarding social ideologies depends upon his ability to reason in hypothetical deductive terms. As the young
person gains the capability of extending himself beyond his present experience he begins to envision new alternatives which involve participation in adult societal roles (Piaget, 1972). The structural changes which take place during adolescence are an essential phase which concern emotional and social, as well as mental aspects. The nature of the cognitive change is revealed in several ways. For example, as the adolescent becomes less egocentric, his conversation takes on a new dimension as he is able to assume another's position in thoughts and feelings (Piaget and Inhelder, 1958).

Erikson has suggested that attainment of formal operations allows the adolescent to more clearly perceive situations and make more reasonable decisions. Erikson views formal operations as conducive to ego identity formation. In formal operations the adolescent can apply his new found logic to social situations. He can hypothesize in considering all possible alternatives and carefully weigh the advantages and disadvantages of each. As the adolescent begins to reason hypothetically and deductively to infer consequences of decisions and actions, he can imagine many possible solutions to various problems. This is an important gain in personal development (Miller, 1978). To successfully achieve an ego identity as postulated by Erikson and operationalized by Marcia, the adolescent must consider and make commitment to vocational choices and personal values (Gallatin, 1975). It is in the age range 11 to 15 that the mental structures involved in formal operations allow the adolescent to fully consider all circumstances (Piaget, 1972). According to Marcia (1980) it is important to note that adolescence is the first time that social adjustment and
cognitive skills come together to play a fundamental part in future development. The organizational structure of both psychosocial development and cognitive development must not be considered as static, but as gradually changing over time. The responses which result from these evolving changes of psychosocial and cognitive development change with age and experience, with adolescence seen as a crucial transition point (Marcia, 1980).

Rationale and Hypothesis

Since a complementary relationship between formal operations and ego identity has been stated by both Piaget and Erikson and the aspects of that relationship have been previously described, it is expected that predictive values would emerge from the scores on a test of formal operations, a survey of egocentrism, a measure of ego identity, and various subscales of the measurements utilized. The general assumption, in agreement with Marcia (1980), is that formal operations are a necessary but not sufficient condition for identity achievement. It is also expected that adolescent egocentrism which has been described by Piaget as a central element in formal operations would be predictable from the test of operational thinking. The young adolescent has trouble differentiating between his own concerns and the concerns of others. This results in an obsession with what others are thinking and becomes the cataclysm of adolescent egocentrism (Adams, 1976). As the adolescent matures in formal operational thought, a decentering process occurs in which the young person can separate his thoughts from the thoughts of others and gains in the ability to as-
sume another person's thought position rather than being obsessed with self thoughts (Elkind, 1967).

Also, one would expect to be able to predict ego identity from degree of egocentrism. When the young person can see himself in a more realistic manner after replacing the imaginary audience by a real audience, he will also engage in more effective and closer relationships as he is no longer obsessed with his own thoughts. Rather than self-concern, he can engage in genuine concern for others and can integrate feelings of others with his own feelings and share mutual concerns. The natural progression in relationships would be toward ego identity.

The present study will also hypothesize that variables of grade and sex will be predictive as they pertain to formal operations, egocentrism, and ego identity. Piaget assumed the onset of formal operations to occur around age 11 or 12. Neimark (1975a) and Keating (1980) in their review of the research agree that virtually every study that has made age comparisons of Piagetian tasks has revealed the significant effect of age. Regarding age and egocentrism, Elkind (1978b) states that the young adolescent is more egocentric than the older adolescent. Especially, the imaginary audience accounts for much of the self-centeredness of the young adolescent. Also the personal fable accounts for much of the perplexing behavior as children enter adolescence. The child finds it difficult to take the viewpoint of others, while the young adolescent becomes fixated with other people's points of view and the older adolescent in dispelling egocentrism as formal operations become more firmly established replaces the imaginary or ideal with the real. Regarding age and ego identity,
the theoretical assumptions of Erikson (1959) and supportive research (Marcia, 1966; Meilman, 1979; Wagner, 1976) indicate that identity formation increases with age.

Lerner and Spanier (1980) state that the study of the variable of sex as related to formal operations has proved inconclusive. Some studies find differences and others do not. In the research presented in this study, several researchers such as Keating and Schaeffer (1975) and Douglas and Wong (1977) revealed superior performance by males on formal tasks. Peskin (1980) presented research indicating that the formal operational tasks are more male than female oriented.

Very few theoretical assumptions and little research could be located regarding sex per se as it relates to egocentrism. Elkind and Bowen (1979) hypothesized that at all grade levels, girls would score higher in egocentrism than boys. The data indicated that girls tend to be more reluctant than boys to reveal themselves to an audience.

A sex difference has appeared in some of the studies on ego identity but findings are not consistent. Some evidence indicates that the foreclosure status is more common for women than for men. With increased women's movements in the 70's, this idea may now be outdated. Gallatin (1975) stresses that attempts to extend the identity status research to females has not been very successful. Marcia and Gallatin both agree that Eriksonian theory has its limitations as far as women are concerned because the model itself is a somewhat masculine one. More crucial to drawing firm conclusions is the fact that studies dealt with different male-female populations, different types of identity status interviews were employed, and assessment was made
in different ways regarding different variables (Bourne, 1978). Therefore, from the theoretical concepts of Piaget and Erikson and the research implications, one can predict that as formal operations become more stabilized, egocentrism will decrease, allowing ego identity to become more firmly established. Also, it is predicted that age and sex will aid in predicting the developmental process of formal operations, egocentrism, and ego identity.

The specific null hypothesis being tested is that there is no relationship between ego identity and formal operations, egocentrism, grade and sex. The alternative research hypothesis being considered in this study is that a regression model can predict ego identity from formal operations, egocentrism, grade and sex. The multiple regression model is as follows:

\[ Y = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 \]

where

- \( Y \) = ego identity status
- \( X_1 \) = formal operational thought
- \( X_2 \) = level of egocentrism
- \( X_3 \) = grade
- \( X_4 \) = sex

The initial research hypothesis is that the above model explains the formulation of ego identity as the adolescent progresses through the developmental process. Regression models including the various sub-scales of the independent and dependent measures will be presented.
CHAPTER II
REVIEW OF LITERATURE

Formal Operations

In the past decade there has been increased interest in the cognitive changes that occur during adolescence. Pertinent areas of investigation in formal operations which will be discussed include age comparisons and stage-like progression, the relationship between formal operational thought and intelligence, language ability, culture, moral development, and a variety of other variables such as attitude, interest, memory, and creativity. Also discussed will be empirical investigations that have raised several questions regarding Piagetian premises.

Age and Stage Progression

Neimark (1975b) in one of the few longitudinal studies completed to date, traced the transition from concrete to formal operations. She tested three groups of elementary children in grades 3 to 6 over a three to four year period. Each child was tested with a diagnostic problem-solving task plus one of Piaget's tasks. The Piagetian tasks included combination of colors, permutation of digits and correlation. Analyses of the data supported the Piagetian concept of improvement in cognitive ability with age and the longitudinal pattern of a stage-like progression through temporary transitional phases is in accord with Piagetian theory. A variety of data analyses for each cognitive task separately showed improvement in cognitions over time.
Webb (1974) administered three Piagetian tasks of advanced concrete operations and two tasks of formal operations to 25 subjects, ages 6 to 11, with IQs over 160. All subjects passed the concrete operational tasks, but only four subjects successfully completed the formal operations tasks. Therefore, Piaget's age and progression stage theory was confirmed with the bright students following the stage-like progression with no stages skipped or reordered.

Martorano (1977) examined formal operations as a developmental task. The subjects consisted of 80 white middle-class females in the sixth, eighth, tenth, and twelfth grades. Ten of the Inhelder and Piaget tasks were performed by each subject. The data disclosed that as grade increased, performance on the tasks improved with the greatest change occurring between the eighth and tenth grades. The results suggested that formal thinking begins to emerge at about 12 to 15 years of age but it was determined that formal operational thought is not fully attained and integrated during adolescence as not even the oldest age group consistently evidenced formal operations across all tasks.

Ronning (1977) examined the existence of age-related changes in problem-solving strategy and the effects of providing a model for the best strategy in problem solving. Subjects were 32 boys and 31 girls in grades one, three, and five. The problems presented to the children were of the formal operations variety. Results supported a stage progression in cognitive development and indicated that modeling strategy was most effective at the fifth grade level when children were in transition from concrete to formal operations.
The Lunzer Analogies Test was utilized as a measure of formal operations by Hillman (1980) in assessing 194 sixth, eighth, tenth, and twelfth graders regarding grade level and formal reasoning and occupational and educational aspirations and formal reasoning. The prediction that formal operations increased with age was confirmed. No significant differences between level of formal operations and vocational and educational aspirations were found.

Schwebel (1975) assessed level of logical thinking in 60 sophomore college students. Of the 60, 20 percent scored at the upper level of formal operations, 63 percent at the lower level of formal operations, and 17 percent at concrete operations. Logical thinking, determined by the Piagetian task of rods, balances and truck problems, was also found to have no relationship to high school rank or SAT scores. This data supported a stage progression but questions Piaget's assumptions that formal operations are fully established in early adolescence.

Research thus far is in basic support of Piaget's supposition of a systematic, stage-like progression with no stage skipped or reordered. However the onset of formal operations occurred in many subjects several years later than proposed by Piaget and many older adolescent subjects did not attain the full formal operational stage.

Intelligence and Formal Operations

Several researchers have investigated the relationship between intelligence and cognitive concepts. Major studies reveal interesting results in this area. Gamoka (1978) studied the relationship between
formal operations and structure of intellect abilities. The subjects consisted of 452 high school students from age 11 to 19. Two Piagetian problem-solving tasks and 12 structure of intellect tests were presented. Piagetian problem-solving task ability was significantly related to the structure of intellect ability to evaluate semantic relations. The integration period of structure of intellect was identified as the period of emergence of formal thinking in the Piagetian stage of development.

Subjects in a study by Keating (1975) consisted of 200 middle-class fifth and seventh grade boys. Psychometric measures designated the above average and average students. In examining the relationship between psychometric above average intelligence and cognitive precocity, the researcher, using Piagetian tasks, confirmed the hypothesis that the above average subjects evidenced formal operations far more frequently than the average subjects of the same age.

The relationship of psychometric reasoning ability and Piagetian operational assessment in females was examined by Keating and Schaffer (1975), and they compared the results obtained in this study with Keating's (1975) study with males. The Iowa Test of Basic Skills determined psychometric above average intelligence. Subjects were 40 girls in grades six and eight. The Piagetian tasks of displacement, balances and pendulum were employed. The prediction that the scholastically above average females would show earlier acquisition of formal operations was borne out in every case. Among both boys and girls the younger above average students evidenced more ability to reason logically than the older average students. Also, the younger
boys scored significantly higher than the younger girls on Piagetian tasks even though the younger girls were 10 months older. No other sex differences were found.

Sieber (1978) studied differential growth patterns of psychologically above average and average students. Sixty-six females between 10 and 14 were matched on age and birth order, but differed in IQ, one bright and one average group. The WISC was utilized to determine intelligence and five Piagetian tasks assessed formal operations. IQ was found to predict precocity in the concrete and formal operations stage and significant differences were found in that above average students consolidated operations within a stage more so than average students.

Hardy (1979) compared formal operations, general intelligence, and school achievement among 110 white, middle class adolescents with average and superior IQs. Subjects were in the 7th, 9th, and 11th grades. Seven Piagetian tasks measured formal operations, the WISC measured intelligence and grade point average represented achievement. Measures of formal operations were found to be significantly related to IQ and school achievement with total formal operations more developed in students of superior IQ. Also superior students were found to acquire formal operations at an earlier age.

Cloutier and Goldschmid (1976) support the hypothesis that intelligence is significantly correlated with Piagetian concepts and offer the following character sketch of the high scores on the Piagetian proportionality test: (a) is active and quick to respond,
(b) maintains a systematic method of reasoning, (c) generates original ideas, (d) has less discipline problems than his peers, (e) frequently has doubts about his capacities, and (f) is able to initiate activities when left alone in a school situation.

However, Kuhn (1976) analyzed psychometric measurement as related to Piaget's cognitive assessment and found that the two variables are significantly related in young children (age 6 to 8), but are not significantly related in older children (age 10 to 12). The subjects consisted of 108 subjects with a mean age of 7 years, 9 months.

The relationships which exist among 27 Piagetian assessments and standard measures of intelligence and achievement were investigated by Stephens, McLaughlin, Miller, and Glass (1976). The subjects consisted of 75 students with IQ of 90-110, and 75 retardates, IQ 50-75. Each group of 75 was further divided into age groups of 25 each. The age groups were 6-10, 10-14, and 14-18. The Wide Range Achievement Test and Wechsler intelligence scales when correlated with the Piagetian reasoning measures indicated that Piaget's reasoning tasks involve abilities separate from those measured by standard tests of achievement and intelligence.

Thus, intelligence has been found to be related to formal operations, in most studies. However cognitions in one study were related to intelligence in only young children, while a study with retardates indicated a difference in abilities determined by standard psychometric devices and Piagetian tasks.
Language Ability and Formal Operations

Piaget's assertion that language ability is not necessarily related to cognitive development has become the topic of recent research. Furth and Youniss (1969) became interested in Piaget's claim that propositional thinking can develop without the support of language ability. They tested six deaf adolescent boys with low ability in spoken and written English with six tasks of formal operations. Five subjects succeeded on at least one task lending support to Piaget's claim regarding language and formal operations.

Piaget's proposition that level of cognitive development is not dependent on concurrent language development was supported in further research by Furth and Youniss (1971). Subjects were 40 profoundly deaf children with marginal language systems who were compared with 40 normal hearing and speaking high-school students. Formal operations was assessed by the Piagetian tasks of symbol logic, probability and combinations. According to the data, 28 percent of the deaf subjects, compared to 53 percent of the hearing subjects, showed formal operatory success. It was confirmed that verbal language is not a prerequisite to formal operations.

Deaf and hearing subjects were also assessed by Ross and Holmann (1975) as to performance on formal operations. The experiments involving binary choice situations lasted over two years and the results were supportive of previous studies in confirming that deaf adolescents can attain formal operations. Therefore, it was concluded that a proficiency in language was not a precursor of formal operations. Piaget's
assumption that level of cognitive attainment is not dependent on language development was supported.

Level of cognitive development and verbal ability were also investigated by Jones (1972). Three Piagetian tasks were utilized to assess formal operations. Three subscales from the WISC measured verbal ability in 44 grade six boys. According to the data, there was no relationship between verbal ability and formal operations. Boys who were deficient in verbal ability showed no less ability in thinking in formal operational terms.

Cultural Studies of Formal Operations

Several studies have looked at cognitive development in different cultures. The subjects for a study by Douglas and Wong (1977) were 60 American and 60 Hong Kong Chinese adolescents ages 13 to 15. Cultural, age, and sex differences were tested using the Piagetian tasks of color combinations, invisible magnet, and projection of shadows. American subjects performed at a more advanced level in formal operations, 15 year olds were more advanced than the 13 year olds, and boys were more advanced than girls.

A cross-cultural investigation involving Piagetian concepts was conducted by Feldman and Stone (1978). The subjects were 152 rural Hawaiian children and 133 children from Chicago. Ages of the children ranged from 5 to 17. The Colored Blocks Test, a recently-developed test based on Piagetian stage abilities, was utilized to measure cognitive development because of its cultural-free aspects. Data supported the hypothesis that a stage progression of thinking is a
universal phenomena and the beginnings of formal thought were found in both cultures. Beginning at age 14 in the Chicago sample and at age 15 in the Hawaiian sample, roughly 40% of the subjects scored in the beginning stage of formal operations. In the Hawaiian sample, there was no increment in higher formal operations between ages 14 to 17. An increase toward higher formal operations between ages 14 to 17 was found in the Chicago sample.

Moral Development and Formal Operations

Keasey and Keasey (1974) were among the first to investigate the relationship between cognitive and moral development. Thirty girls in grade six and 24 college coeds were presented with Kohlberg's moral judgment interview and Piaget's pendulum, balance and rod tasks. Formal operations were found to be a necessary condition for moral development.

Langford and George (1975) also studied the relationship of formal operations and moral development in 65 girls, ages 12 to 15. Four of Kohlberg's "moral dilemma" stories and Inhelder and Piaget's "floating bodies" problem provided data indicating that formal operations was a precondition to moral judgment.

Kuhn, Langer, Kohlberg, and Hoan (1977) researched the level of attainment in logical and moral development of 340 subjects between the ages of 10 to 50. Formal operations were assessed by Piaget's tasks of pendulum, correlation, and chemicals. Moral judgment was determined by Kohlberg's standard interview. The data supported previous research that logical and moral levels are significantly
related and that formal operations are a prerequisite to the emergence of principled moral judgment.

Walker and Richards (1979) approached moral development and formal operations from a different angle. They hypothesized that subjects who had attained early basic formal operations would be more susceptible to attempts to stimulate moral development than those subjects only in beginning formal operations. Responses to four Piagetian tasks among the 216 female adolescents ranging from 14 to 21 indicated that stage of cognitive development was an important variable in attempts to stimulate moral reasoning development.

Faust and Arbuthnot (1978) also investigated the relationship between moral and formal reasoning. The sample included 117 females and 111 male college students. The Kohlberg Questionnaire, Form A, was employed to determine moral level. A paper-and-pencil group test assessed cognitive development. Results revealed that Piagetian stage sets a limit on moral reasoning and that the variables of cognition and moral level should be considered in planning moral educational programs.

Finally, the relationship between formal operations and moral development was also investigated by Marcia and Rowe (1980) in examining 26 subjects with Kohlberg's Form A and 2 tasks of Piagetian logic, beam balances and colored combination liquids. These results substantiates Faust's and Arbuthnot's findings and confirm that formal operations are a necessary but not sufficient condition for moral development. Therefore from the research it can be concluded that a significant relationship exists between moral development and formal
operations with formal operations being a necessary but not sufficient condition for moral development.

Other Variables Related to Formal Operations

Formal operations have been researched according to a variety of other variables. Attitude toward task, interests, memory, creativity, and self-description are some of the important variables that have been researched.

Peskin (1980), noting that studies frequently report that more males than females attain formal operations, hypothesized that attitude toward task affects task performance. Two groups of South African female students, age 14 to 16, served as subjects. Forty girls who took science as a subject and 60 who did not stated their preference for either Piagetian tasks or logically female-oriented tasks. Half of the subjects were then given Piagetian tasks and half were given logical female-oriented tasks. Content preference was found to be significantly related to performance. The female-oriented and Piagetian tasks were identical in every way other than content such as kitchen spices/chemicals. More subjects from the non-science girls favored female-oriented content and performed at a higher cognitive level than the non-science girls given Piagetian tasks. The science girls had no preference toward task, and there was no difference in performance between female-oriented and Piagetian task. The previous conclusion that males out perform females on Piagetian tasks must take into consideration preference regarding task.
Bart (1971) hypothesized that an individual will manifest formal operations initially with respect to topics of interest. Ninety adolescents, ages 13, 16, and 19 were given an interest inventory and a 60-item reasoning test. Results were that the hypothesis was confirmed but that the association between level of interest and level of formal reasoning decreases with age.

Ross (1976) investigated the relationship between creativity and formal operations. Two sixth grade classes and two tenth grade classes were given R. P. Fisher's questionnaire to measure formal operations and the Torrance Tests of Creative Thinking. The unexpected finding was that the general increase in formal thinking from early to middle adolescence was accompanied by a significant decrease in creativity among the subjects.

Wolf (1981) also examined the relationship between cognitive development and creative thinking during adolescence. The research supports previous findings and reports a low and frequently negative correlation between measures of creativity and formal operations.

Use of organizational memory statuses and formal operations were scrutinized by Wyatt and Geis (1978). The students were 28 ninth graders. In free-recall tasks, late formal operational adolescents showed greater output organization and recall than early formal operational adolescents.

A moderate positive correlation between scores on a test of formal operations and a free response self-description test were found by Holmes (1978). Subjects were 162 teenage males and females, ages 12,
14, 16, and 18. Abstraction of self increased with age as did formal operations.

The relationship between metaphor comprehension and Piagetian cognitive tasks was analyzed by Billow (1975). The results from 50 boys, ages 5 to 13, indicated that metaphor comprehension was a classificatory behavior and was strongly related to cognitive operations.

Kuhn (1977) questioned when and how children develop the ability to solve syllogisms and argued that facility in concrete operations is necessary and sufficient for competence in simple syllogistic forms. The hypothesis that dealing with complex syllogistic statements requires formal operations was confirmed.

Nissim-Sabat (1980) examined the relationship between cognitive development, measured by two Piagetian tasks, and temporal extension, measured by the Lines Test. It was hypothesized that concrete operational subjects would be more present oriented and formal operational subjects more future oriented. The results support the hypothesis of significant differences between concrete and formal operational thinkers on measures of present and future extension with formal thinkers being significantly more future oriented. Also, a greater percentage of males than females performed at the formal operational level.

With the increased interest in cognitions in adolescents in relation to Piaget's concepts and sometimes conflictual findings, it naturally follows that empirical evidence has created healthy skepticism of Piagetian theory in its entirety. Several Piagetian concepts have been questioned in recent studies, especially the con-
cepts of age of onset of formal operations, final stage reached, and correlation between cognitive tasks themselves.

A short-term partially longitudinal study conducted by Kuhn and Brannock (1977) illustrates the questions regarding onset of formal operations and final stage reached. The sample consisted of 265 adolescents and adults between the ages of 10 and 50 and a smaller group of 75 pre-adolescents between 10 and 12. Logical operations were assessed by Piaget's pendulum, correlations, and chemical problems. Only about 30% of adults, it was found, had completely achieved consolidated formal operations. Approximately 65% of the adults remained in the transition between concrete and formal operations. Fifteen percent showed no formal thought process at all. No significant sex differences were found. A second part of the study involved 75 fifth through seventh graders tested by three Piagetian tasks at the beginning of the study and nine months later. Sixty of the original 75 were available for the later testing. For each of the three problems, the most frequent pattern from first to second testing was an advance of several substages for each problem. Almost half the sample showed a rise in overall composite scores. The change occurring most frequently among subjects in the age range sampled was the transition to a level of predominantly formal operations. This study supported Piaget's stage progression concept but raised serious doubts as to whether most adults reach the final stage of formal operations as surmised by Piaget.

An interesting study was conducted by Clayton and Overton (1976) to examine the role of concrete and formal operations in a young and
old population, the relation between operational thought and Cattrell's fluid and crystallized intelligence, and the role of different living arrangements in maintaining operational thought. The subjects, eighty females from three age groups (18-20 years, 60-70 years, and 70-80 years), were assessed on a series of Piagetian tasks and indices of fluid and crystallized intelligence. Results indicated that that older age groups demonstrated significantly poorer performance on all Piagetian tasks than the younger age group. However, the older age groups did not differ among themselves. No age differences were found for the concrete operational transitivity tasks. Fluid intelligence was found to be significantly related to be operational thought while crystallized intelligence was not. The older subjects who lived independently did not perform significantly different from the older subjects who lived in homes for the aged. It was difficult to judge from this cross-sectional study if older people began to lose the ability to perform formal operations or if these subjects did not possess the early or final stages of formal operations originally. Piaget indicated that the final stage of formal operations, if reached, is maintained throughout lifetime. Longitudinal studies would possibly explain the affects of aging on operational thought.

From another viewpoint entirely, Arlin (1975), in suspecting that thought structures may extend beyond formal operations, proposed an adult stage of cognitions called the problem-finding stage. Subjects were 60 female college seniors. The Piagetian tasks utilized were colored chemicals, pendulum, and projection of shadows. The problem-finding task consisted of a problematic situation, an opportunity for
subjects to raise questions within that situation and a way of cate-
gorizing the questions once raised. A significant correlation between Piaget's problem-solving and a problem-finding stage was discovered.

However, the possibility of a fifth stage of cognitive development suggested by Arlin was investigated by Cropper, Meck and Ash (1977). Eighty-six college undergraduates, age 18 to 35, performed three operational tasks, pendulum, projection of shadows, and inclined plane. Subjects were also presented with a problem finding task. Results indicated no relationship between performance on problem finding tasks and formal operations. The previous research by Arlin (1975) was not confirmed. Arlin (1977) again measured operational thinking and problem-finding skills in 65 children in grades 2, 4, and 6. Nine Piagetian tasks were administered and a problem-finding situation presented. The results revealed that operational thought process and quality of questions in problem finding were definitely related. As results are inconclusive regarding a fifth stage of cognitive development, further research is necessary.

A subtest of a new British intelligence scale, a propositional logic game, was utilized by Airasian, Bart, and Greaney (1975) to ascertain hierarchial skills in formal operations. The propositional logic game incorporated items testing the sixteen binary propositions of a two-variable situation as articulated by Inhelder and Piaget (1958). Responses from 60 fourteen year olds, analyzed by an ordering theory, revealed a non-linear hierarchy in which certain of Piaget's binary operations were prerequisites for other binary operations.
However, there were significant instances where a subject failed a prerequisite item at a lower hierarchical level but passed an item at a higher level.

A developmental analysis of two formal operational structures, combinatorial thinking and conditional reasoning, was completed by Roberge (1976). Subjects were 80 above-average students in the fifth, sixth, seventh, and eighth grades. The results suggested that combinatorial thinking problems and conditional reasoning arguments are both formal operational tasks and that formal operational structures emerge during adolescence, but there was no significant relationship between scores on the two tasks. Roberge (1976) noted that Piaget suggested that attainment of the formal stage may occur in different areas at different times.

The purpose of a study by Wavering (1980) was to investigate the interrelationships among proportional, probabilistic, and correlational reasoning in 94 subjects, grades 8, 10, and 12. The results showed that scores on projection of shadows and correlation tasks were significantly different from scores on the probability task. Six percent of the subjects obtained the highest level on proportion, 28 percent on probability, and 3 percent on correlations.

Bynum, Thomas, and Weitz (1972) investigated Piaget’s statement that a fully developed formal operational thinker uses all 16 binary operations in solving problems. The single protocol of Role of Invisible Magnetism, a Piagetian physical task, was utilized and revealed that the subjects used only eight of the 16 operations and that eight of the Inhelder-Piaget analyses were faulty. Piaget is
criticized for basing his assumptions on only single protocol from a physical task and questions were asked regarding use of all 16 operations by fully-developed operational thinkers. Further research by these investigators (Weitz, Bynum, Thomas, and Stegler, 1973) attempted to replicate the Inhelder-Piaget results among 57 subjects, found that not one of the subjects used more than five of the 16 operations with no developmental trend with regard to number of operations.

Neimark (1975b) whose study was mentioned previously, found that the ability to perform the Piagetian task of combinations appears to be acquired prior to the ability to perform permutations. Also, the ability to perform correlations is acquired last in the three tasks she researched.

However, Lawson (1977) in determining the relationship among individual performance on Piagetian tasks administered Piaget's rods, beam, and chemical combinations tasks to 28 male and female seventh grade students with a wide range of mathematical ability. Responses on each task ranged from early concrete to fully formal operational thinking. The results revealed a significant correlation among tasks and substantiate Piaget's concept that the tasks require use of the same or a unified set of cognitive operations. The wide range of performance on the three tasks, when theoretically formal operations should have been at least partially developed, question Piaget's statement regarding the onset of early formal operations as occurring around age eleven to twelve.
A summary of the presented research on formal operations confirms the fact that cognitions occur in an orderly stage-like progression but a discrepancy exists as to the age of onset of formal operations, whether everyone reaches formal operations, or if once attained, formal operations is a permanent state. Also there is controversy regarding an adult cognitive state or stages. There does appear to be a relationship between intelligence and cognitive development, at least at a young age. Support has been gained for Piaget's assumption that formal language is not a precursor of formal operations and formal operations was found to be a necessary but not sufficient condition for moral development. Also several studies confirmed Piaget's position that culture affects formal reasoning. A variety of other variables have been researched in relationship to formal operations but have not been thoroughly examined in enough studies to present conclusive facts.

**Adolescent Egocentrism**

Egocentrism appears to be a relatively unexplored aspect of human development. Little empirical research was found regarding Piaget's concepts of egocentrism in adolescents. Looft (1971) looked at egocentrism as a possible life span phenomena. He researched egocentrism and social interaction among young and elderly people, hypothesizing a regression to egocentrism in later years. Forty-six subjects under age 21 comprised the young adult group. The older group consisted of 34 subjects, all over 65 years of age. Egocentrism was assessed by a series of Piagetian tasks designed to measure the ability to shift
perspectives or accept another person's point of view. Subjects were also placed in pairs in a social situation based on egocentrism scores. The young adult group was found to have a significantly lower level of egocentrism or greater ability to decenter. However, the results revealed no significant interaction between egocentrism and social interaction.

Chandler (1973), defining egocentrism as the inability to successfully adopt roles or perspectives of others, studied 45 chronically delinquent boys and 45 non-delinquent boys between the ages of 11 and 13. The measure utilized to determine egocentrism was derived from Flavell's work and assessed the degree of the subject's role-taking skills. Significant differences between the two groups were found with the delinquent group exhibiting a marked developmental lag in successfully adopting the role or perspective of others. Reduction of egocentrism with increasing age was not found to be statistically significant in non-delinquent or delinquent groups.

The topic of childhood egocentricity was researched by Kissel (1975). Exner's Self-Focus Sentence Completion was utilized to test the hypothesis that preadolescents would obtain lower egocentric scores than adolescents. Seventy-nine fourth graders and 63 ninth graders served as subjects. Egocentrism was found to be significantly related to age, supporting the hypothesis that adolescents would show more interest in self than the pre-adolescent group.

Castellano (1978) investigated early father absence and egocentrism. The subjects consisted of 80 Mexican American females, age 13-17, from low income families. The Dramatic Acting Test employed as
measure of egocentrism indicated that girls from intact families were not significantly different from girls from father-absent homes regarding egocentrism.

The purpose of a study by Drudy (1978) was to study the effects of applying different forms of training to emotionally disturbed children in reducing egocentric behavior. Thirty-one emotionally disturbed children in a special treatment home served as subjects. The Tacit Coordination and Nonzero Sum Games determined no significant difference between the experimental group who received special training in reducing egocentrism as compared to those in the control group who received no training.

Enright, Lapsley, and Shukla (1979) formulated a measure of adolescent egocentrism that proposes to assess Elkind's theoretical components of the construct of egocentrism including the imaginary audience, personal fable, and other or self-focus. Ten males and ten females each at grades six, eight, and college indicate that the imaginary audience and personal fable decline with age. Surprisingly, general focusing on self was found to increase with age.

Having devised the scale referred to as the AES (adolescent egocentrism sociocentrism), Enright, Shukla, and Lapsley (1980) investigated the construct validity of the egocentrism subscale of the measure with a measure of self-consciousness developed by Fenigstein. A total of 220 adolescents, mostly white and middle-classed, grades six, eight, ten, twelve and college, participated in the study. Results supported Elkind's concept that adolescent imaginary audience and personal fable decline with age. Also college students showed a higher degree
of sociocentrism than other age groups. Self-consciousness was found to be moderately related to egocentrism. An unexpected finding was the large sex difference occurring for all egocentrism subscales and total egocentrism score, with females scoring as more egocentric than males.

Approximately 700 4th, 6th, 8th, 10th, and 12th grade boys and girls, ages 9 to 17, participated as subjects in a study by Elkind and Bowen (1979) in which the IAS (Imaginary Audience Scale) was used as developed by Elkind. The test measures the aspects of abiding-self and transient-self as proposed by Elkind. On both subscales, the 8th grade subjects scored significantly higher in egocentrism than the older subjects or younger subjects and girls attained significantly higher scores than boys.

Even though research in the area of egocentrism is scant, one fact often substantiated is that egocentrism declines with age. Whether remedial programs are effective in reducing egocentrism is speculative and the possibility exists of a link between delinquency and egocentrism. Father absence was not found to be related to egocentrism in females. There are many aspects of adolescent development and egocentrism that would warrant further investigations, such as ego identity and formal operations.

Ego Identity

A vast amount of research on ego identity has been conducted in the past several years. The semistructured interview developed by James Marcia (1966) has been utilized most frequently to study ego
identity. In this review those studies employing methods other than Marcia's will be discussed first, followed by a review of studies employing Marcia's interview according to variable under investigation. The studies employing other than Marcia's interview utilized basically the Q-sort method and self-report questionnaires.

**Self-Descriptive Q-Sort Procedures**

Gruen (1960) hypothesized that a stable sense of ego identity would be related to realistic and idealistic traits a subject would apply to himself. Forty-five summer session students, ages 18 to 24, were asked to sort 100 Q sort items using first real self and then ideal self instructions. Students were then assessed on their willingness to accept a false personality sketch. A significant positive relationship was found between subjects self-ideal discrepancies and tendency to accept a false personality sketch.

An hypothesis investigated by Howard and Kubis (1964) stated that ego identity in college women would be negatively related to anxiety, hostility, and conflicting mother-daughter relationships. The sample consisted of 130 female freshmen and 115 female sophomores, ranging in age from 17 to 20. Rasmussen's Ego-Identity Scale, Taylor's Manifest Anxiety Scale, the Manifest Hostility Scale, and the Mother-Daughter Problem Checklist indicated that sophomores scored higher in ego identity while freshmen scored higher in anxiety and hostility. Also, a negative relationship between ego identity and mother-daughter problems was confirmed.

In a three-year study by Hauser (1972) twenty-two black and white high school males sorted self-descriptions according to self-image.
On both variables there were distinct race differences with negro boys indicating a tendency toward identity foreclosure while the whites tended toward progressive identity formation.

In summary, according to research gathered by the Q-sort method, evidence for positive significant relationships was found to exist between ego identity and willingness to accept a false personality sketch. A significant negative relationship was found to exist between ego identity and anxiety, hostility, and mother-daughter problems. Also, a study among black and white adolescents discovered a tendency toward black foreclosure and toward whites progressing in identity formation.

Self-Report Questionnaires

The following studies utilized self-report questionnaires in researching ego identity. Dignan (1965) devised the Ego Identity Scale (EIS) which was administered to 130 college female freshmen and 115 sophomore females along with a semantic differential scale completed by subjects according to their own response and how they perceived their mothers would respond. Subjects with high scores on the EIS scored significantly higher in identifications with their mothers. Rasmussen (1964) developed a questionnaire which categorized Navy recruits into subsets measuring degree of resolution of Erikson's various psychosocial stages. The instrument was able to differentiate recruits receiving high and low sociometric ratings from peers.

Hershenson (1967) employing a self-report questionnaire and a role-consistency procedure found a low but significant correlation
between a subject's self-image and image expected from others and commitment to a consistent vocational role among 162 male college juniors. Simmons (1970) provided multiple-choice alternatives to the sentence completion portion of Marcia's scale. The resulting Identity Achievement Scale (IAS) revealed a low but significant relationship with the Endurance and Succorance scales of the Edwards Personal Preference Test and low but significant positive relationships with several subscales of Shostrom's Personal Orientation Inventory. The IAS was found to be significantly correlated with crisis and commitment of the interview ratings of Marcia.

Studies utilizing the self-report questionnaire research method indicate that ego identity may be significantly related to perceived maternal identification, psychosocial development, self-image and others' image of self, and commitment to a vocational role. A review of the previous literature reveals that precise conclusions are difficult to draw because interpretation and definitions of Erikson's work differed for the researchers as well as the measurements employed to assess ego identity.

Research Employing

The Ego Identity Status Paradigm

James Marcia (1964, 1966) became dissatisfied with the measures being employed to research ego identity. In his opinion, the measures tested traits which would follow an achieved identity but did not deal explicitly with the psychosocial criteria as he interpreted Erikson's concepts. Marcia proposes two major criteria regarding identity
status based on Erikson's work: (1) There is evidence that crisis has been experienced, and (2) there is enduring vocational and ideological commitment based on one's personal values that are congruent with establishing a role in present-day society. The interview, as developed by Marcia, takes 15 to 30 minutes to complete (Bourne, 1978).

Four identity statuses, as proposed by Marcia (1966), describe alternative modes of intrapsychic and societal response regarding identity formation. The four statuses are viewed by Marcia as different degrees occurring along a continuum with identity achievement as the final status (Bourne, 1978). The Identity Statuses according to Marcia (1966) are:

- **Identity diffusion** - applies to the individual who has or has not undergone crisis but has failed to make commitments and is not searching for alternatives.
- **Identity foreclosure** - the individual expresses commitment to vocation and ideology but does not acknowledge having experienced crisis.
- **Identity moratorium** - refers to the individual in the midst of crisis and seeking commitment.
- **Identity achievement** - the individual has experienced an identity crisis and has made a commitment to vocation and ideology.

The following studies employ Marcia's scale and can be classified roughly as pertaining to three broad variables: cognition, personality, and development. Most studies use 50-150 subjects and assign subjects to one of the four identity statuses. The statistical measure most commonly applied is the t-test or analysis of variance.
Cognition

Marcia (1966) found no significant differences in 86 college men regarding the identity statuses and intelligence as measured by the 40-item vocabulary recognition portion of the Shipley-Hartford Intelligence Scale. This result was replicated in research among 49 female college seniors (Marcia and Friedman, 1970) using the same measures as Marcia.

The Ghiselli Analysis of Relationship Test used by Schenkel (1975) as an index of IQ was not significantly related to identity status in 55 senior college women. Finally, Cross and Allen (1970), employing SAT scores, found no significant difference in IQ among the identity statuses of 81 college males.

However, if one considers academic achievement as a measure of cognition, there are several studies that support a relationship between ego identity and academic orientation. Cross and Allen (1970), in the previous study, controlling for scholastic aptitude, reported a highly significant relationship between ego identity and grade point average, while Orlofsky (1977), using the TAT, found that 111 males and female college achievers and moratoriums exhibited higher achievement motivation than foreclosures and identity diffusions. Also, achievement and foreclosure subjects chose more difficult majors according to the above study by Marcia and Friedman (1970).

Ego identity status and expressive writing among 127 high school juniors and 64 college students were examined by Waterman and Archer (1979). The results indicated that students who were currently writing poetry were significantly more likely to be in the achiever
status and were significantly less likely to be in the foreclosure status. Interestingly, Orlofsky (1977) found when exploring fear of success in his 111 subjects, that female achievers and moratoriums showed the greatest fear of success while male achievers and foreclosures showed the greatest fear of success.

Marcia in 1966 (in a previously mentioned study) utilizing the Bruner et al. Concept Attainment Task, found the identity achievers to perform significantly better than the other statuses. Bob (1968) replaced this study but under stressful and non-stressful conditions. The results indicated significant differences among the identity statuses with identity achievers scoring higher under stress. Foreclosures showed no change under stressful or non-stressful conditions, and moratorium and diffusion statuses scored lower under stress.

No difference was found in cognitive flexibility among college women employing the Luchins Water Jars Test in the Marcia and Friedman (1970) study. The previously mentioned study by Schenkel (1975), using Witkins' construct of field independence, indicated that foreclosures and achievers were more field independent than diffusions and moratoriums.

Leadbeater (1981) interviewed 92 males 17 to 20 years of age concerning ego identity and problem solving using the Watson-Glaser Critical Thinking Appraisal as a measure of formal operational thought. The achievement and moratorium status subjects performed better in problem solving than those in the foreclosure and identity diffused statuses.
Cauble (1976), using 45 males and 45 female college students, found no relationship between identity status and formal operational thought using the Constantinople Inventory of Personality Development to determine identity formation, and the Piagetian pendulum, rods, and balance tasks to determine formal reasoning. Also, Berzonsky, et al. (1975) found no relationship between ego identity status, 18 verbal syllogistic measures of formal operations, and a concept-attainment task in sixty undergraduate females.

However, Wagner (1976) in a longitudinal study of 10-18 year olds found a very low, positive relationship between ego identity and formal operations. Rowe and Marcia (1980) using 20 males and 6 females and the Piagetian tasks of beam balance and colored liquids found that only those subjects who were in formal operations were in the Identity Achieved Status.

Afrifah (1980) also examined the relationship between cognition and ego identity. Subjects were 102 Ghanian males between the ages of 17 and 20. Three Piagetian tasks determined level of logical thinking. The hypothesis regarding the necessity of formal operations prior to the occurrence of identity questioning was not supported. The researcher suggested the formulation and testing of theoretically appropriate hypotheses to determine the relation between cognition and ego identity.

Waterman and Waterman (1974) measured reflexitivity-impulsivity with the Matching Familiar Figures Test. Among 93 college males, achievers and moratoriums were significantly more reflective than fore-
closures and diffusions. Protter (1973) in studying temporal perspective, disclosed that achievement and foreclosures were more oriented to the future than the other statuses. Subjects were 90 male and 73 female college students in the sophomore to senior years.

In summarizing general conclusions regarding cognitions and ego identity, one can assume that ego identity is not related to IQ. Research regarding concept attainment and formal operations, when studied in regards to ego development, has presented conflicting results. There is some evidence of a positive significant relationship between ego identity and academic achievement. On some cognitive measures those in the higher identity statuses appear to perform better than those in the lower statuses, but no definitive statements can be made at present.

**Personality Variables**

A wide variety of personality variables have been examined in relationship to ego identity. The four receiving the most attention are: (1) Authoritarianism, (2) Anxiety, (3) Self-esteem, and (4) Internal-external locus of control (Bourne, 1978).

The personality correlate most commonly supported in the literature on ego identity is that foreclosure subjects score significantly higher than the other identity statuses regarding authoritarianism (Marcia, 1966, 1967; Marcia and Friedman, 1970; Matteson, 1974; Schenkel and Marcia, 1972). Marcia (1967) studied 72 college males. Matteson's (1974) subjects were 99 Danish youth, 17 to 18 years old. The measure of authoritarianism utilized in all these studies was a
subscale of the California F Scale. It is interesting to note that in most of these investigations, moratoriums scored significantly lower than the other three identity statuses regarding authoritarianism (Bourne, 1978).

In studying anxiety, the Welsh Anxiety Scale was employed by Marcia (1967) and Mahler (1969). Both investigators found that college male moratorium subjects scored significantly higher in anxiety than the other three statuses. Some confirmation of these findings was offered by Oshman and Manosevitz (1974) who reported that moratoriums scored significantly higher on the MMPI Pt scale than the other statuses. However, among college women, Marcia and Friedman (1970) found identity diffusion subjects to score significantly higher on the Welsh Anxiety Scale than the other statuses.

In the area of self-esteem, findings have been very controversial. Marcia (1966) found no differences among the statuses using the De-Charms and Rosenbaum Self-Esteem Questionnaire. In 1967, Marcia repeated this study with the added dimension of manipulation of self-esteem. No difference in change regarding self-esteem was noticed for any of these statuses. However, when averaging change in self-esteem for each status, it was concluded that achievement and moratorium subjects were less affected by manipulation than the other statuses.

Also investigating self-esteem, Cabin (1966) found that higher identity status college males rated themselves more positively in an ambiguous social situation than did lower status males. This finding was substantiated by Rosenfeld (1972) in reporting that college males scoring high in identity also scored higher in self-ideal similarity with self than did the subjects scoring low in identity.
A reversal of prediction regarding self-esteem occurred in Marcia and Friedman's study of 1970. Among female subjects, achievers scored significantly lower on the Self-Esteem Questionnaires and foreclosures scored the highest. In a repeat study, Schenkel and Marcia (1972) did not find support for the previous finding of low self-esteem in females. However, identity achievements and moratoriums scored higher on self-esteem than did foreclosures and diffusions in 95 undergraduate males according to Bruer (1973). Orlofsky (1977), using male and female subjects, found no difference in self-esteem in any identity status. Pomerantz (1979) using 609 junior and senior high school students, examined the variables of physical self-satisfaction, self-esteem, and ego identity, in relation to satisfaction with social milieu. The three variables were found to predict a moderate amount of the variance regarding satisfaction with social milieu. Of interest is the fact that for males, self-esteem was the best predictor, and for females ego identity was the best predictor of satisfaction with social environment. Thus far, results have been conflictual regarding self-esteem, and further research is necessary with possibly more control over the measures employed and the statistical analysis utilized.

Self-concept, closely related to self-esteem, has also received the attention of investigators. Bunt (1968) revealed a greater discrepancy among identity diffused subjects regarding self-concept and their conception of how others perceived them than was found among the moratoriums. Subjects were 109 high school males. Using 120 middle-class white high school students as subjects, LaVoie (1976) employed
the Tennessee Self-Concept Scale and found that self-concept was more positive among the high identity statuses than among those who scored low in identity.

Rotter's internal-external (I-E) scale was used by Waterman, et al. (1970) to assess locus of control in male college subjects. The results indicated that significantly more achievers and moratoriums exhibited internal locus of control as compared to foreclosures and diffusions who were more externally oriented. Matteson (1974) reported that foreclosures and diffusions scored lower on autonomy than did achievers and moratoriums among his 99 Danish subjects. Among 92 male college freshmen, foreclosures appeared to be more willing to let their families make decisions for them according to Waterman and Waterman (1970). Of interest is the fact that Neuber and Genthaver (1977) in assessing 11 male and 11 female graduate students found that identity achievers and moratorium males and females took more responsibility for their own lives than diffusion or foreclosure.

In summary, regarding internal-external locus of control, the higher identity statuses scored higher on the I-E scale and appeared to assume more responsibility for their lives, while foreclosures and diffusion scored lower on the I-E scale, and appeared to be less autonomous. Foreclosures were more willing to let families control their lives.

In summarizing personality correlates, it can be stated that foreclosures appeared more authoritarian while moratoriums appeared less authoritarian. Findings are controversial thus far in the areas of anxiety and self-esteem. Self concept may be more positive among the
higher statuses with diffusions confused as to self and other perception. Also the higher identity statuses appear to have more internal control than the lower statuses.

Related Scale Variables

Developmental aspects regarding ego-identity have been an interesting research topic. The variable of moral development has drawn attention recently. Podd (1972) found identity achievers and moratoriums to be functioning at higher levels of moral development than foreclosures and diffusions. Approximately 100 male college juniors and seniors were interviewed using four of Kohlberg's nine moral dilemmas. Responses were scored preconventional, conventional, and postconventional. Podd noted that significantly more identity diffusion subjects were at preconventional stages of moral reasoning, but failed to confirm his hypothesis that a greater number of foreclosure subjects would be at the conventional stage. In the previously mentioned research by Cauble (1976), no significant relationship was found between ego identity and moral reasoning utilizing Rest's Defining Issues Test to determine principled morality. Hayes (1977), using Hogan's measures of moral attitudes, reported that among 66 male college students that those in the high identity statuses were more ethical, empathetic, and socialized than subjects in the low identity statuses. Marcia and Rowe (1979) also researched level of moral reasoning and ego identity. Level of moral thought was found to be significantly related to ego identity among the 26 subjects. Kohlberg's Form A-1 Standard Moral Interview was used to assess moral
development. At the present time it appears that the evidence regarding the relationship between ego identity and morality tends to conclude that ego identity status may be a prerequisite to high moral reasoning.

Matteson (1972) investigated male-female roles as related to ego identity and found among the 99 Danish students that more females than males appeared to undergo an exploration of sexual identity. LaVoie's (1976) study examined sex-role identification employing two measures, Heilbrun's Masculinity-Feminity Scale and the Laxowick form of the semantic differential. No difference in sex-role was found in masculinity-feminity among the different identity statuses. Schenkel (1975) in studying fifty-five college women utilized the Gough Feminity Scale and reported a trend toward a significant relationship between ego identity status and traditional feminity. Diffusion subjects had lower traditional feminity scores than the other statuses. The few studies investigating male-female roles do not present evidence from which definitive conclusions can be drawn at this time.

Interpersonal relationships and intimacy have been viewed as variables of development relating to ego identity. The most satisfactory personal relationships appear to be attained by achievement and moratorium subjects. Intimacy status interviews were employed by Orloffsky, et al. (1973) and Marcia (1976b). Subjects were classified into five intimacy categories. According to Orloffsky, et al. (1973), achievement and moratorium subjects were in the intimate and pre-intimate categories. A large proportion of identity diffused and foreclosed subjects were in pseudo-intimate and pre-intimate status. Amazingly, of the 53 college males, nearly one-third of the identity
diffusions were in the isolate status which indicated a general lack of relationships and a tendency toward pre-occupation.

Marcia (1976b), in one of the few follow-up studies on ego identity, found interesting results regarding intimacy among male subjects who had taken the Identity Status Interview approximately ten years prior. More than one-half of the previous achievers and moratoriums currently scored in the high intimacy statuses. Three-fourths of the foreclosures and diffusions currently scored in the lower intimacy status. Kinsler (1972), using Yufit's paper and pencil test of intimacy, found identity diffusions to be lowest of the intimacy statuses. Kacerguis and Adams (1980) determined ego identity and intimacy statuses for 44 college men and 44 college women. The hypothesis of more advanced stages of identity development being associated with higher levels of intimacy was supported. Intimacy was assessed by Orlofsky's Intimacy Interview, Yufit's Intimacy Scale and the Rubin Loving and Liking Scales. It appears that one of the more consistent findings in regard to ego identity is that the achievement and moratorium statuses attain closer interpersonal relationships.

Marcia's four-category status classification was related to interpersonal attraction by Goldman et al. (1980) using 84 male and female college students as subjects. Interpersonal attraction was determined by having subjects judge four same-sex college strangers described by a four-page summary. An attraction scale was attached to each summary. All subjects preferred strangers who had or were undergoing a crisis
to those who had never experienced crisis. Evaluation of strangers was definitely affected by the ego identity status of the judge as well as that of the stranger.

Shea, Crossman, and Adams (1978) studied the relationship between physical attractiveness and ego identity. Approximately 294 male and female Caucasian college students were interviewed. A scale of physical attractiveness devised by Adams, plus Marcia's Ego Identity Incomplete Sentence blank, Levinson's Internal Locus of Control, and a sentence completion measure of ego development, formulated by Loevinger, Wessler, and Redmore were employed. The data failed to confirm any relationship between beauty and socially desirable attributes.

James Donavan (1975) completed such an intensive and in-depth analysis of the identity statuses that it deserves special attention. Although his subjects were few, 13 male and 9 female undergraduate students, the method of investigation was unique. The subjects were participants in an unstructured course on personal behavior at a large Mid-western State University. The students were observed and tape recorded in 39 group sessions. Identity statuses were determined and a distinctive interpersonal style toward peers and authority was associated with each identity status. Marcia's ego identity status was utilized as well as three projective tests: the Rorschach, the TAT and the Early Memories Inventory. Each subject was also asked to write a 10 to 20 page bibliography and to keep a brief log of daily activities. Interpersonal data from the class was scored using the Process Analysis Scoring System. A sketch of each identity status as
derived by Donavan in examining all the information gathered about each subject will be presented briefly.

According to Donavan (1975) three subjects were placed in the category of identity diffusion. They appeared basically withdrawn, had no specific plans, seemed confused regarding politics, religion, and sexual relationships. They kept odd hours and stated feeling out of place in society. They had difficulty defining their feelings and preferences. The identity diffused subjects' parents did not seem to understand them and were not very involved with their activities. Their behavior in the classroom was apathetic with some inappropriateness. They rarely spoke to peers or the teacher.

Six subjects, five females and one male, scored in the foreclosure category. These subjects had interjected their parents' plans for them although they were more liberal than parents regarding religion, politics, and sexuality. They portrayed their homes as loving and affectionate. The parental concern appeared stifling to the researcher. This group participated actively with peers, talking more than the other statuses. They were good leaders and sometimes disagreed with tact.

Eleven of the 22 subjects fell into the moratorium group, and there was much variation. Other students often referred to this group as unique and interesting. The moratoriums appeared competent and autonomous although some were restless and ambivalent at times. Some seemed to prefer power in the group. They got along well with peers and extremely well with the teacher although disagreement was common with some hostility.
Only two subjects were in the identity achieved categories. Both were female in the mid-forties. They were non-defensive and nurturing types that could care for others in a non-committal manner.

In summarizing Donavan's work, the research indicates that level of identity development is directly related to interpersonal style. Donavan concluded that interaction with others is dealt with in a characteristic fashion according to ego identity status.

Perception of parental attitudes has been researched by Cross and Allen (1971) and Jordan (1971). The Children's Report of Parental Behavior was administered to college freshmen and sophomores to measure parental attitude. Conflicting results were obtained mainly because of varying statistical analysis, and difficulty arose because perception of parental attitudes could not be considered as entirely accurate. Jordan (1971) duplicated her study, using college juniors and seniors and allowed subjects and subjects' parents to complete the questionnaire. Important results revealed that the relationships between moratoriums and achievements and their parents could be described as ambivalent as parents were found to be both accepting and rejecting with achievement feelings much more moderate regarding ambivalence than moratoriums. Foreclosures demonstrated, as expected, very much closeness to their parents with sons and fathers remarkably close. Diffusions' parents seemed detached and uninvolved in their children's affairs. This was particularly true of fathers and sons.

Josselson (1973) studied 48 college senior women in their early twenties regarding psychodynamic aspects of identity formation. A clinical psychologist interviewed each subject regarding background and
present attitudes and fantasies. Data were used to describe the four identity statuses. Among other findings, Josselson reported that both achievements and moratoriums in contrast to foreclosures had ambivalent identifications and experienced conflict with their mothers. The achievements viewed the maternal introjects as flexible while the moratorium wished to throw off the introject entirely.

In summarizing the research regarding ego identity status and parental relationships, achievements and moratoriums appear to experience more ambivalent feelings while foreclosures experience closeness and diffusions experienced detachment from parents.

College adjustment has also been viewed as a developmental aspect regarding ego identity. Academic achievement in college was investigated by Cross and Allen (1970) in 81 college males and results indicated that identity achievers appeared to be best adapted. Overall satisfaction in college regarding quality of education, faculty, administration and fellow students was researched by Waterman and Waterman (1971). Moratoriums appeared less satisfied regarding college education and administration than foreclosures and achievers. Moratoriums also chose to change majors most often (Waterman and Waterman, 1972).

Mandell (1979) hypothesized a relationship between ego identity status and coping potential among 118 male and female college freshmen. The results of the Ego Identity Scale, Identity Status Interview, and student TAT indicated that ego identity was positively associated with coping potential in both male and female college students with those in the higher statuses having better coping skills.
Regarding drugs, Dufresne and Cross found foreclosures to be in the adamant non-drug user category predominantly but found few moratoriums in the category of adament nonuser. Pack et al. (1976) in examining marijuna usage, found that those subjects who were able to stop smoking marijuana were more likely to be in achievement or foreclosure statuses while moratoriums and diffusions had never smoked or continued to smoke.

Tzuriel and Klein (1977) investigated the relationship of ego identity to ethnocentrism in 378 Israeli high school students. Besides Marcia's scale, the Ethnocentrism and Ethnic Group Identification Scale was utilized. High ethnocentrism subjects were also high in ego identity.

Finally, longitudinal studies regarding stability of ego identity status by Waterman and Waterman et al. (1974) and Marcia (1976b) revealed that identity status is not particularly stable. In Waterman's study, 50 percent of 70 college males changed statuses. As expected, achievers were most stable and moratoriums were least stable. Marcia's study (1976b) supported the previous finding regarding moratoriums, but found surprisingly that achievements were less stable over time. Marcia's study revealed that 57 percent of the achievers moved to a lower status while 16 percent of the lower statuses (foreclosure and diffused) moved to a higher status. Marcia concluded that perhaps identity status is an ongoing process rather than a station in life at which one can finally arrive.

When considering development and ego identity, several conclusions can be made. Achievements and moratoriums revealed a higher level of
moral development, more intimate relations with peers, more conflictual and ambivalent relationships with parents, and better adjustment to college. Stability of ego identity over time indicated that ego-identity was more temporary than previously suspected. More research is needed in this area.

**Relationship of Age to Ego Identity**

Age in relationship to ego identity has been a secondary variable in many studies, but will be discussed briefly due to its importance. Age changes in ego identity status during adolescence have been investigated using various ego identity scales. Stark and Traxler (1974) utilizing the Dignan Ego Identity Scale, hypothesized that subjects within the age span 17 to 20 would report significantly lower ego identities than subjects in the age span 21-24 and that females would score less in ego diffusion in both age groups. Significant differences were found among the 507 subjects in relation to identity status across age and grade. The hypothesis was supported that identity processes crystallize in later adolescence. Also the hypothesis of fewer females in the diffusion category was substantiated. This study was further validated by Protinsky (1975). His 203 subjects ranged in age from 13 to 24. The Ego Identity Scale of Rasmussen was employed as the identity measure. Results indicated that the older adolescents scored significantly higher than the younger ones on the ego identity scale. LaVoie's study (1976) also found that subjects scored higher in ego identity with age. Meilman (1979) conducted a quasi-longitudinal investigation by studying 25 white males in each
of five age groups (12, 15, 18, 21, and 24) and reported large increases with age. The percentage of subjects in the achievement status increased with age while the subjects in the diffusion category decreased with age. Offer et al. (1970) reported that 19 to 20 year-old males had not achieved an identity but were progressing toward consolidation.

Thus, it can be concluded that age is a crucial variable in relation to ego identity. As adolescents progress in age they attain a higher degree of ego identity formation.

Two relatively unexplored populations regarding ego identity are high school drop-outs and employed young people who have completed high school. An interesting study by Munro and Adams (1977) examined ego identity in college students and working youth. More working youth were found to have an achieved identity than college students. Occupational identity was the same for each group. Among the 57 subjects approached in public places and asked to take the Ego Identity Status Interview and Incomplete Sentence Blank, it was revealed that working youth are more committed than college students to a given identity. More research in this area is necessary to confirm these findings.

A summary of the presented research on ego identity as it relates to cognitions, personality, and development yields increased understanding of the adolescent period. No significant relationship was established between ego identity and intelligence but evidence indicated a significant correlation between other cognitive variables such as
academic achievement and ego identity. There are conflicting results regarding ego identity and formal operations.

Regarding personality variables, foreclosures appear more submissive to authority. There is some evidence that moratoriums may exhibit more anxiety. Controversy exists regarding self-esteem and identity status but some studies show increased self-concept among higher statuses. Also locus of control was found to increase as identity scores improved.

As to developmental variables, moral development appears higher among the higher statuses. Evidence regarding sex role and identity is inconclusive. One of the more consistent findings is that subjects in moratorium and achievement statuses tend to be able to attain more intimate relationships with peers. The relationship regarding parental attitudes and ego identity is unclear at this time but moratorium and achievements appear to experience more ambivalence in relations with parents.

Many other variables have been studied in relation to ego identity but definitive conclusions cannot be drawn until other researchers examine these same variables. An interesting area of research presently is stability of identity status throughout a life time. Research is needed in the area of high school dropouts and also among non-college 18-24 year olds who secured jobs upon high school graduation.
CHAPTER III
RESEARCH PROCEDURES

Subjects

The 120 subjects for this study consisted of 15 males and 15 females in the eighth, tenth, and twelfth grades and a college sophomore class. The volunteer subjects ranged in age from 13 to 24. The subjects were drawn from a Roanoke County junior and senior high school and an area community college. The junior and senior high school students were tested during study halls. The community college students were assessed before or after a scheduled class. The subjects were white, predominantly middle-class students.

Instruments

Formal Operations. Burney (1974) developed and validated the Piagetian Formal Operations Instrument (Appendix A) as part of the requirements for a Ph.D. at the University of Colorado in 1974. Forty-two paper-and-pencil items were developed that were hypothesized to measure formal operations after a review of the literature and theoretical concepts had been studied. These 42 items were administered to fifty ninth grade, eleventh grade, and college freshmen students. An equal number of males and females were selected at each grade level. Subjects were classified as formal operational if they answered 17 or more of the 24 questions correctly. Suggested test time was 50 minutes. A set of five tasks proposed by Jean Piaget to measure formal operations was administered to give criterion validity to each item. A biserial r was
computed for each item. Twenty-four items were then selected for the paper-and-pencil instrument. The final form of the instrument along with the five tasks was administered to seventy-eight ninth grade, eleventh grade, and college freshmen students. Two values of biserial r were then reported for each item, one using criteria scores (item validity) and the other using total scores on the test (internal reliability). A Pearson r of .85 was obtained to determine concurrent validity by comparing scores on the objective test with scores on the Piagetian tasks. The Kuder-Richardson formula #20 revealed a reliability coefficient of .825. When students were classified as formal or nonformal by the two instruments, an 88.5% agreement in classification was obtained.

**Egocentrism.** The Adolescent Egocentrism-Sociocentrism Scale (Appendix B), developed by Enright, Shukla and Lapsley (1980), assesses three components of adolescent egocentrism including personal fable, imaginary audience, and general self-focus. The scale was validated using 220 volunteers, 22 males and 22 females each at grades six, eight, ten, twelve, and college. The questionnaire consists of 15 statements which the subjects rate on a five-point likert scale. Scoring of each item ranges from 1 (no importance) to 5 (great importance). The higher the subject's score, the more egocentric is the subject. Factor analysis was used to determine if the three subscales of the AES (imaginary audience, personal fable, and self-focus) tap a common dimension. The three factors of personal fable, imaginary audience, and self-focus were identified. Therefore, while the items separate into three factors, the scales themselves cluster together. This sug-
gests that the three subscales tap a common underlying egocentrism dimension.

For reliability estimates, Cronback's alpha of internal consistency was computed on the entire sample. The reliability coefficient was found to be .83. With age controlled for, egocentrism was found to be moderately related to self-consciousness. As mentioned previously, an unexpected finding was that the self-focus subscale revealed a curvilinear relationship with age. The sixth-grade mean was significantly higher than the twelfth grade mean, whereas the college mean was significantly higher than both eighth and tenth grade means. A pilot study had revealed a linear relationship with self-focus increasing rather than decreasing with age.

**Ego Identity.** Each participant's ego identity status (achieved, moratorium, foreclosed and diffused) in vocation, religion, politics, and sex role was determined by use of a semi-structured interview developed in 1980 by Archer (Appendix C) especially for adolescents and similar to the interview designed by Marcia (1966). The interview took approximately 25 to 40 minutes to administer. In each of the four content areas the presence or absence of an identity crisis and the degree of commitment was identified and used as the criteria to establish each identity status. In Archer's study (1980), interviews were tape-recorded and scored by trained judges. Twenty-five percent of the interviews from each grade level were scored twice to analyze interjudge reliability. The percentage of exact agreement for vocations was 75%; religion, 80%; politics, 90%; sex-roles, 78%; with an average agreement of 81%.
The test-retest reliability of the instrument was determined by interviewing one male and one female from each of the four grade levels a second time approximately two weeks later the initial interview. Ninety-four percent of the identity statuses remained constant.

**Scoring of Instruments**

**Formal Operations.** The total number of correct responses on the PFOI was used in statistical analysis.

**Egocentrism.** The total AES score, as well as each subscale (imaginary audience, personal fable, and self-focus) score was utilized in the statistical analysis.

**Ego Identity.** Each subject was assigned a score (diffusion = 0), foreclosure = 1, moratorium = 2, and achievement = 3) in each of the ego identity content areas of vocation, religion, politics, and sex-role based on work by Marcia (1964, 1966), Waterman and Waterman (1970) and Archer (1980). The definitions found in Appendix D have been supplied by Dr. Alan Waterman and Dr. Sally Archer from their work with adolescents and adults in regard to ego identity and were used as basic criteria to determine ego identity status per content area. The four ego identity scores were then summed for a Summary Status Score.

Also, raters assigned an Overall Status Score to each subject based on criteria offered by Waterman and Waterman (1970) and Archer (1980) in which consideration was given to:

1. The "latest" identity status attained. The sequence from earliest to latest is: diffusion, foreclosure, moratorium, achievement.
2. The clearest and most classic status.
3. The status of the content area in which the subject feels strongest.
4. The most frequently scored status.
5. A combination of the above with clinical judgment.

Method of Data Collection

The data were collected in two sessions. In the first session the subjects completed the background data and the adolescent Egocentrism Scale. In the second session, the subjects were administered the 50-minute Piagetian Objective Formal Instrument and interviewers trained by the researcher conducted the Ego Status Interview. The researcher scored 25 percent of the interviews to establish interjudge reliability. Exact agreement for vocation was 90 percent, religion was 92 percent, politics was 86 percent, and sex role was 91 percent, with an average agreement in all areas of 89 percent.

Statistical Analysis

The data were subjected to multiple regression analysis. The forward stepwise method was employed. The regression coefficients were used to determine which of the predictive variables contributed more to the explanation of the variance in the criterion measure.
CHAPTER IV
RESULTS AND DISCUSSION

The specific null hypothesis tested in this study assumed no relationship between ego identity and formal operations, egocentrism, grade and sex. The alternative research hypothesis suggested that a regression model could predict ego identity from formal operations, egocentrism, grade and sex.

The initial alternative research model of regression was:

\[ Y = B_0 + B_1 x_1 + B_2 x_2 + B_3 x_3 + B_4 x_4 \]

where

- \( Y \) = ego identity
- \( x_1 \) = score on the formal operational test
- \( x_2 \) = score on the egocentrism measure
- \( x_3 \) = grade
- \( x_4 \) = sex

Ego identity status was investigated by use of the Ego Identity Interview prepared especially for adolescents by Archer (1980) and based on the work of James Marcia (1964, 1966, 1976a, 1980). Formal operations were measured by the Piaget Formal Operations Instrument (Burney, 1974) and egocentrism was measured by the Adolescent Egocentrism-Sociocentrism Scale developed by Enright, Lapsley and Shukla (1979). Regression models were also developed representing different aspects of the various measures utilized. The four areas assessed by the Ego Identity Interview were vocation, religion, politics, and sex role. The Piagetian Formal Operations Instrument measured the
concepts of hypothetical, proportional, syllogistic, propositional, correlational, and analogical reasoning. The adolescent Egocentrism-Sociocentrism Scale measured the concepts of imaginary audience, personal fable and self-focus. The Pearson Product Moment Correlation was utilized to determine the relationships among variables.

Descriptive information regarding subjects' response on the measures will be presented first, followed by a discussion of the significant relationships among the variables. Lastly, the results of the regression analysis will be discussed.

Characteristics of Subjects

The subjects (15 males and 15 females each at grade levels 8, 10, 12 and college sophomores) ranged in age from 13 to 24, with mean age being 16.64. The ages of the subjects are summarized in Table 1. The eighth, tenth, and twelfth grade subjects were drawn from a junior and senior high school in southwest Roanoke County, and the college sample was drawn from a community college in the same area. The sample consisted of all white, predominantly middle-class subjects. The subjects represented a variety of student types as they were selected according to availability, and they represented various levels of scholastic achievement and interests. Therefore, the subjects were assumed to be at various levels of ego identity, egocentrism, and formal operations.

Subject Responses Regarding Ego Identity

Each subject was assigned an ego identity status score of 0 = diffusion, 1 = foreclosure, 2 = moratorium, and 3 = achievement in
Table 1
Age of Subjects

<table>
<thead>
<tr>
<th>Age</th>
<th>No. of Subjects</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>21</td>
<td>17.5</td>
</tr>
<tr>
<td>14</td>
<td>8</td>
<td>6.7</td>
</tr>
<tr>
<td>15</td>
<td>12</td>
<td>10.0</td>
</tr>
<tr>
<td>16</td>
<td>17</td>
<td>14.2</td>
</tr>
<tr>
<td>17</td>
<td>16</td>
<td>13.3</td>
</tr>
<tr>
<td>18</td>
<td>16</td>
<td>13.3</td>
</tr>
<tr>
<td>19</td>
<td>12</td>
<td>10.0</td>
</tr>
<tr>
<td>20</td>
<td>13</td>
<td>10.8</td>
</tr>
<tr>
<td>21</td>
<td>2</td>
<td>1.7</td>
</tr>
<tr>
<td>23</td>
<td>2</td>
<td>1.7</td>
</tr>
<tr>
<td>24</td>
<td>1</td>
<td>0.8</td>
</tr>
</tbody>
</table>
each of four areas: vocation, religion, politics, and sex role. The statuses for each area were then totaled for a summary status score. Therefore, a subject's summary status score was 0 if diffused in all areas and a 12 if achieved in all areas. The summary status scores are presented in Table 2 with the number of subjects and percentage of subjects assigned each summary status.

As can be seen from Table 2, four subjects were diffused in all areas and one subject was identity achieved in all areas. The four different areas of ego identity researched and the number and percentage of subjects falling in each area are presented in Table 3. Also presented in Table 3 for comparison are the results of Archer's (1980) study.

Regarding the present study, the data in Table 3 reveal that a large percentage (69%) of subjects were diffused regarding politics, and 35 percent were in the diffusion status regarding vocation. Almost half of the subjects were foreclosed in religion and sex role. It is not surprising that more than the majority of subjects had no stable ideas or direction regarding politics as many people do not get very politically involved in youth (Gallatin, 1975). Almost half of the subjects being foreclosed in religion and sex role indicate that they have accepted values and ideas in these two areas from significant other people in their lives such as parents and teachers. Thirty-five percent of the subjects being diffused in vocation, with only 11 percent achieved, is not unexpected since 83 percent of the sample was
Table 2

Ego Identity Summary Status Score

<table>
<thead>
<tr>
<th>Summary Status Score</th>
<th>Subjects</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>4</td>
<td>3.3</td>
</tr>
<tr>
<td>1</td>
<td>17</td>
<td>14.2</td>
</tr>
<tr>
<td>2</td>
<td>17</td>
<td>14.2</td>
</tr>
<tr>
<td>3</td>
<td>21</td>
<td>17.5</td>
</tr>
<tr>
<td>4</td>
<td>15</td>
<td>12.5</td>
</tr>
<tr>
<td>5</td>
<td>16</td>
<td>13.3</td>
</tr>
<tr>
<td>6</td>
<td>9</td>
<td>7.5</td>
</tr>
<tr>
<td>7</td>
<td>10</td>
<td>8.3</td>
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<tr>
<td>8</td>
<td>6</td>
<td>5.0</td>
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<tr>
<td>9</td>
<td>9</td>
<td>2.5</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>0.8</td>
</tr>
<tr>
<td>11</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>12</td>
<td>1</td>
<td>0.8</td>
</tr>
</tbody>
</table>
Table 3

Ego Identity Status Score Per Area of Ego Identity
Present Study Compared with Archer's Study (1980)

<table>
<thead>
<tr>
<th>Area</th>
<th>Present Study Status Determined by</th>
<th>Archer's Study</th>
<th>Present Study No. of Subjects</th>
<th>Archer's Study Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ego Identity Interview</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vocation</td>
<td>Achieved</td>
<td>Achieved</td>
<td>13</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>Moratorium</td>
<td>Moratorium</td>
<td>40</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Foreclosed</td>
<td>Foreclosed</td>
<td>25</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td>Diffused</td>
<td>Diffused</td>
<td>42</td>
<td>57</td>
</tr>
<tr>
<td>Religion</td>
<td>Achieved</td>
<td>Achieved</td>
<td>16</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Moratorium</td>
<td>Moratorium</td>
<td>22</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Foreclosed</td>
<td>Foreclosed</td>
<td>55</td>
<td>72</td>
</tr>
<tr>
<td></td>
<td>Diffused</td>
<td>Diffused</td>
<td>27</td>
<td>60</td>
</tr>
<tr>
<td>Politics</td>
<td>Achieved</td>
<td>Achieved</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Moratorium</td>
<td>Moratorium</td>
<td>14</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Foreclosed</td>
<td>Foreclosed</td>
<td>19</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Diffused</td>
<td>Diffused</td>
<td>83</td>
<td>142</td>
</tr>
<tr>
<td>Sex Role</td>
<td>Achieved</td>
<td>Achieved</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Moratorium</td>
<td>Moratorium</td>
<td>21</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Foreclosed</td>
<td>Foreclosed</td>
<td>56</td>
<td>132</td>
</tr>
<tr>
<td></td>
<td>Diffused</td>
<td>Diffused</td>
<td>34</td>
<td>12</td>
</tr>
</tbody>
</table>
under age 20. It would be expected that most of the subjects in moratorium would move into the achieved category with time.

A comparison of the present study with Archer's study of 1980 (in which the same Ego Identity Interview was utilized with 160 subjects in sixth, tenth, and twelfth grades) reveals overall similarities and trends. In the area of vocational identity, the percentage of subjects in the present study in the achieved and diffused statuses are almost identical to the findings of Archer. In the religious identity, the percentage of subjects in the achieved and foreclosed statuses are almost equal in both studies. Both studies found a large percentage of subjects to be foreclosed in religious and sex-role identity and diffused in political identity. Overall, the present study found more subjects to be in the moratorium status and less in the foreclosed status when compared to Archer's study. This result would be expected when considering that subjects in this study were eighth thru college sophomores while Archer's subjects were sixth thru twelfth graders.

The results of the Overall Assigned Ego Identity Status of each subject are presented in Table 4. As can be seen, eight subjects or 6.7 percent were assigned an achievement status with 40 percent of the subjects falling in the diffused category on the overall score. Wagner (1976), utilizing an interview developed from the work of Marcia (1966), found 26 percent of the subjects to be diffused, 58 percent to be foreclosed, 6 percent to be moratorium, and 10 percent to be achieved. Wagner's subjects were age 10 to 18 and the identity areas assessed were vocation, marriage, and ideological beliefs about war.
Table 4

Ego Identity
Overall Status Assignment

<table>
<thead>
<tr>
<th>Status</th>
<th>No. of Subjects</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achieved</td>
<td>8</td>
<td>6.7</td>
</tr>
<tr>
<td>Moratorium</td>
<td>24</td>
<td>20.0</td>
</tr>
<tr>
<td>Foreclosed</td>
<td>40</td>
<td>33.3</td>
</tr>
<tr>
<td>Diffused</td>
<td>48</td>
<td>40.0</td>
</tr>
</tbody>
</table>
It is difficult to draw conclusions from comparing the results of this study with Wagner's because different ego identity interviews were utilized, subjects were in different age ranges, and different ego identity areas were assessed.

Subject Responses Regarding Formal Operations

Information is presented in Table 5 regarding subjects' scores on the Piagetian Formal Operations Instrument. The scores reveal that only two subjects answered all items correctly. Burney (1974) determined that 54 percent of his subjects, ninth, eleventh, and college students, answered 17 or more questions correctly. In this study, 25% of the subjects answered 17 or more questions correctly. The reason for the differences in percentages is possibly because Burney's subjects were from higher grades, ninth, eleventh, and college, while subjects in this study were eighth, tenth, twelfth, and college sophomores. Table 6 indicates percentages of questions answered correctly or incorrectly regarding the different concepts measured by the PFOI. Of interest in Table 6 is the fact that a large percentage of students answered all questions correctly regarding proportional reasoning, but only a small percentage answered all questions correctly regarding analogical reasoning. It appears that understanding analogies is more difficult for these subjects than judging proportions. However, it is difficult to draw any firm conclusions from the data presented in Table 6 because an unequal number of questions measured the different concepts.
Table 5

Piagetian Formal Operations Responses

<table>
<thead>
<tr>
<th>No. of Correct Responses</th>
<th>No. of Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>2</td>
</tr>
<tr>
<td>20</td>
<td>4</td>
</tr>
<tr>
<td>19</td>
<td>5</td>
</tr>
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<td>18</td>
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</tr>
<tr>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Concepts</td>
<td>% of Subjects with all answers correct</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td>Hypothetical Reasoning</td>
<td>37.5</td>
</tr>
<tr>
<td>(Angles-Ques. 1-5)</td>
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</tr>
<tr>
<td>Proportional Reasoning</td>
<td>76.7</td>
</tr>
<tr>
<td>(Balance-Ques. 6-7)</td>
<td></td>
</tr>
<tr>
<td>(Shadows-Ques. 13-14)</td>
<td>78.3</td>
</tr>
<tr>
<td>Syllogistic Reasoning</td>
<td>15.0</td>
</tr>
<tr>
<td>(Syllogisms-Ques. 8-10)</td>
<td></td>
</tr>
<tr>
<td>Propositional Reasoning</td>
<td>37.5</td>
</tr>
<tr>
<td>(Containers-Ques. 11-12)</td>
<td></td>
</tr>
<tr>
<td>Correlational Reasoning</td>
<td>40.0</td>
</tr>
<tr>
<td>(Glasses-Ques. 15)</td>
<td></td>
</tr>
<tr>
<td>Analogical Reasoning</td>
<td>5.8</td>
</tr>
<tr>
<td>(Verbal Analogies-Ques. 16-21)</td>
<td></td>
</tr>
</tbody>
</table>
Subject Responses Regarding Egocentrism

Subject responses to the Adolescent Egocentrism Scale (AES) are presented in Table 7. The AES is a likert scale, and the higher the score the higher the egocentrism of the subject. From Table 7, self-focus appears to be the subscale on which the subjects scored highest. Enright, Lapsley and Shukla (1979) and Enright, Shukla, and Lapsley (1980) found subjects to score higher in self-focus than in imaginary audience or personal fable.

Ego Identity and Related Variables

In formulating the prediction equation, it was assumed from the theory and previous research that ego identity would be significantly related to formal operations, egocentrism, grade, and sex. It was also assumed that the four areas of ego identity under investigation (vocation, religion, politics, and sex role) would be significantly related to formal operations, egocentrism, grade, and sex. A correlational matrix of the major variables is presented in Table 8. An asterisk denotes the relationships that are statistically significant.

In regards to ego identity and formal operations, the theories of Erikson (1968) and Piaget (1972) suggest that as formal operations increase there will be a significant increase in ego identity. In this study, the Pearson product-moment correlation coefficient between scores on a formal operational thinking measure and ego identity interview status was found to be .336 (p < .001) which indicates a significant relationship between ego identity and formal operations and, in general, supports the theoretical assumption that as formal
Table 7
Egocentrism
(AES Questionnaire-Results)

<table>
<thead>
<tr>
<th></th>
<th>Total Scale</th>
<th>Imaginary Audience</th>
<th>Personal Fable</th>
<th>Self-Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Possible Range</td>
<td>15-75</td>
<td>5-25</td>
<td>5-25</td>
<td>5-25</td>
</tr>
<tr>
<td>Actual Range</td>
<td>34-68</td>
<td>7-21</td>
<td>8-25</td>
<td>10-25</td>
</tr>
<tr>
<td>Mean</td>
<td>49.6</td>
<td>14.6</td>
<td>15.2</td>
<td>19.8</td>
</tr>
<tr>
<td>Mode</td>
<td>50</td>
<td>15</td>
<td>15</td>
<td>22</td>
</tr>
</tbody>
</table>
Table 8

The Relationship Between Ego Identity and Formal Operations, Egocentrism, Grade and Sex

<table>
<thead>
<tr>
<th></th>
<th>Formal Operations</th>
<th>Egocentrism</th>
<th>Grade</th>
<th>Sex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ego Identity</td>
<td>.336*</td>
<td>.008</td>
<td>.455*</td>
<td>.051</td>
</tr>
<tr>
<td>Vocation</td>
<td>.244*</td>
<td>-.179**</td>
<td>.374*</td>
<td>.080</td>
</tr>
<tr>
<td>Religion</td>
<td>.275*</td>
<td>.060</td>
<td>.225*</td>
<td>.132</td>
</tr>
<tr>
<td>Politics</td>
<td>.206**</td>
<td>.135</td>
<td>.302*</td>
<td>-.192**</td>
</tr>
<tr>
<td>Sex Role</td>
<td>.162**</td>
<td>.044</td>
<td>.304*</td>
<td>.086</td>
</tr>
</tbody>
</table>

* p < .01

** p < .05
operations increase, ego identity increases. When considering the four specific areas of ego identity under investigation, the coefficients in the matrix indicate that all four areas of ego identity are significantly related to formal operations. As formal operations increase, there is a slight increase in all areas of ego identity under investigation. Berzonsky (1975) and Cauble (1976), in disagreement with Wagner (1976), found no significant relationship between ego identity and formal operations. Rowe (1980), in disagreement with Afrifah (1980), found formal operations to be a necessary but not sufficient prerequisite for identity achievement. Perhaps the controversial conclusions regarding ego identity and formal operations result from the use of different measures of formal operations and ego identity. More studies employing the same measurement tools may yield more consistent findings.

When considering the relationship between ego identity and egocentrism, Erikson's theory, coupled with that of David Elkind, suggests a negative, significant relationship. The correlation matrix in Table 8 reveals that there is no significant relationship between ego identity and egocentrism. Elkind (1978a) states that egocentrism is of interest as it relates to adolescent behavior, especially as young people learn to make decisions which are more or less appropriate for them as individuals. However, this research indicates that there is no significant relationship between decreased egocentrism as the young person learns to see self and others in a more realistic fashion and the ego identity process of coming to know self as a unique individual with goals and direction in life. In regards to con-
sidering the ego identity areas of vocation, religion, politics, and sex role, as related to egocentrism, the correlational matrix on Table 8 reveals a significant, negative relationship between scores on the egocentrism scale and the ego identity subcategory of vocational identity. As egocentrism decreases, there is a small increase in ego identity in the area of vocation.

Referring to the correlational matrix of Table 8 again, it is revealed that there is a significant, positive relationship between grade and ego identity and grade and each of the four areas of ego identity under investigation. Archer (1980) found a positive, significant relationship between grade and ego identity. Along with Archer's conclusion, this research also supports numerous research findings (LaVoie, 1976; Meilman, 1979; Protinsky, 1975; Stark and Traxler, 1974; Wagner, 1976) that ego identity activity becomes more finalized during late adolescence and substantiates the assumptions by Erikson (1956, 1959, 1968) regarding the developmental nature of ego identity.

In considering the relationship between sex and ego identity status, no significant relationship was found. However, when relating sex to the four specific areas of ego identity, a significant negative relationship was found between sex and political ego identity which indicates that boys tend to have experienced more crisis and reached more commitment than girls in the political area of ego identity. Archer (1980) found no significant sex differences in any of the content areas and Wagner (1976) found males to fall
significantly below females in magnitude of ego identity in middle adolescence, but that males increased and tended to surpass females by ages 16 to 18. Other research regarding sex and ego identity has been inconclusive because subjects were drawn from different populations, different types of interviews were used, and different areas of ego identity were assessed (Bourne, 1978).

**Ego Identity Content Areas and Subscales of Various Measurements**

The correlation matrix of Table 9 presents the relationship between the four areas of ego identity and the various concepts measured by the PFOI. From the data presented in Table 9, it appears that the PFOI questions (16-21) on analogical reasoning are more significantly correlated with all the four areas of ego identity investigated than the other questions. Analogical reasoning requires that the subject have the ability to conceptualize schemes and generalizations and be able to reason about a reality through an abstract constancy of factors (Inhelder and Piaget, 1958). Burney (1974) stated in his research that analogies were among the items that appeared to be most successful in measuring formal thought while syllogisms were among the lowest. In this research, analogical reasoning was the concept with the highest correlation to formal operations ($r = .83$, $p < .01$) while syllogistic reasoning was also significantly related ($p < .01$ level, $r = .58$). Questions 11 and 12 on the PFOI regarding propositional reasoning were not significantly related to any of the four areas of ego identity. Propositional reasoning requires that subjects proceed from the possible to the
<table>
<thead>
<tr>
<th>Ego Identity</th>
<th>Hypothetical Reasoning</th>
<th>Proportional Reasoning</th>
<th>Syllogistic Reasoning</th>
<th>Propositional Reasoning</th>
<th>Correlational Reasoning</th>
<th>Analogic Reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.235*</td>
<td>.224*</td>
<td>.209**</td>
<td>.057</td>
<td>.292*</td>
<td>.329*</td>
</tr>
<tr>
<td>Vocation</td>
<td>.254*</td>
<td>.140</td>
<td>.157**</td>
<td>-.002</td>
<td>.203**</td>
<td>.209**</td>
</tr>
<tr>
<td>Religion</td>
<td>.197**</td>
<td>.264**</td>
<td>.155**</td>
<td>.021</td>
<td>.238*</td>
<td>.240*</td>
</tr>
<tr>
<td>Politics</td>
<td>.091</td>
<td>.122</td>
<td>.169**</td>
<td>.021</td>
<td>.276*</td>
<td>.218*</td>
</tr>
<tr>
<td>Sex Role</td>
<td>.066</td>
<td>.061</td>
<td>.073</td>
<td>.121</td>
<td>.057</td>
<td>.210**</td>
</tr>
</tbody>
</table>

*p < .01

**p < .05
actual and isolate factors involving evaluating the train of thought, independent of content. Piaget himself has stated that adolescents in the concrete operational category are capable of this to some extent (Inhelder and Piaget, 1958).

Regarding the areas of ego identity and the subscales of the egocentrism measure, the data in Table 10 reveal that there is a significant relationship between the area of vocational identity and imaginary audience and also between vocational identity and self-focus. As the imaginary audience and self-focus decrease, vocational identity increases. It appears that when young people can realize that others are not always scrutinizing them and when they become more socially-centered rather than self-centered, they can gain a stable perspective of self and others and move forward with vocational plans and goals. No other research has been done regarding egocentrism and ego identity.

**Formal Operations and Related Variables**

Regarding formal operations and the variable of age, previous research (Hillman, 1980; Martorano, 1977; Neimark, 1975; Ronning, 1977; Webb, 1974) indicated that as age increased, formal operational thinking increased. A correlational matrix including formal operations and the subconcepts of formal operations with grade is presented in Table 11. Asterisks mark the significant relationships.

As can be seen from Table 11, there is a positive, significant relationship between the scores on the measure of formal operations and grade and between the scores on concepts measured by the PFOI and grade except in the concept of Propositional Reasoning. The
Table 10

Ego Identity and Egocentrism

<table>
<thead>
<tr>
<th></th>
<th>Egocentrism</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Imaginary Audience</td>
</tr>
<tr>
<td>Ego Identity</td>
<td>-.067</td>
</tr>
<tr>
<td>Vocation</td>
<td>-.208*</td>
</tr>
<tr>
<td>Religion</td>
<td>-.014</td>
</tr>
<tr>
<td>Politics</td>
<td>.066</td>
</tr>
<tr>
<td>Sex Role</td>
<td>.014</td>
</tr>
</tbody>
</table>

*p < .05
Table 11
The Relationship Between Formal Operations and Grade and Sex

<table>
<thead>
<tr>
<th></th>
<th>Grade</th>
<th>Sex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formal Operations</td>
<td>.484*</td>
<td>-.052</td>
</tr>
<tr>
<td>Hypothetical Reasoning</td>
<td>297*</td>
<td>-.071</td>
</tr>
<tr>
<td>Angles (Ques. 1-5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proportional Reasoning</td>
<td>.324*</td>
<td>.018</td>
</tr>
<tr>
<td>Balance (Ques. 6, 7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shadows (Ques. 13, 14)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Syllogistic Reasoning</td>
<td>.398*</td>
<td>.000</td>
</tr>
<tr>
<td>Syllogisms (Ques. 8-10)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Propositional Reasoning</td>
<td>.129</td>
<td>-.054</td>
</tr>
<tr>
<td>Containers (Ques. 11-12)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correlational Reasoning</td>
<td>.411*</td>
<td>-.170</td>
</tr>
<tr>
<td>Glasses (Ques. 15)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analogical Reasoning</td>
<td>.444*</td>
<td>-.005</td>
</tr>
<tr>
<td>Verbal Analogies (Ques. 16-21)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .01
results of this study generally support previous findings in that as age increases, there is a moderate increase in formal operations.

Regarding formal operations and the variable of sex, Peskin (1980) questioned previous research (Keating and Schaeffer, 1975; Ross, 1976; and Schwebel, 1975) which concluded that there was a significant relationship between sex and formal operations with males scoring higher. Her research indicated that an interest or preference variable accounted for the difference between scores for boys and girls. In Table 11, the correlation of -.05 between formal operations and sex indicates that there is no significant relationship between sex and formal operations. However, when considering the different concepts measured by the PFOI, there is a significant relationship between sex and the responses to question 15 regarding correlational reasoning with boys scoring higher than girls. Thus, this research, with only one exception, did not support previous research in finding any significant difference between male and female scores regarding formal operations.

Formal Operations and Egocentrism

Piaget (1972) stated that the formulation of hypothetical reasoning will allow the adolescent to consider the viewpoint of the adversary as well as his own viewpoint and will allow for awareness of social ideology. In agreement, Elkind (1979) stated that the egocentrism of early adolescence tends to diminish as formal operations become firmly established. The correlational data in Table 12 do not support the general assumptions by Piaget (1972) and Elkind (1979) that as formal operations increase, there is a decrease in egocentrism.
Table 12

The Relationship Between Formal Operations and Egocentrism

<table>
<thead>
<tr>
<th></th>
<th>Formal Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egocentrism</td>
<td>-.091</td>
</tr>
<tr>
<td>Imaginary Audience</td>
<td>-.223*</td>
</tr>
<tr>
<td>Personal Fable</td>
<td>-.055</td>
</tr>
<tr>
<td>Self-focus</td>
<td>.099</td>
</tr>
</tbody>
</table>

p < .01
However, the data do reveal a significant, negative relationship 
\( r = -0.223, p < .01 \) between the imaginary audience and formal operations, 
indicating that as the adolescent gains the capability to consider 
many hypotheses and logically deduce which are true or false, he feels 
less conspicuous around others and less convinced that others are 
always watching him. No other research has investigated the relationship between egocentrism and formal operations.

**Egocentrism and Related Variables**

Regarding egocentrism and the variables of age and sex, the theory assumes that as age in adolescents increases, egocentrism decreases. Research has been conflictual in this area. Enright, Lapsley, and Shukla (1979), in their first study, found a significant decline in two subscales (the imaginary audience and personal fable) with age, but contrary to expectation, self-focus significantly increased with age, and the total egocentrism scale was not significantly related to age. No relationship was found between sex and egocentrism in the Enright, et al. (1979) study. In a later study, Enright et al. (1980) found a significant decline in imaginary and personal fable with age, but sixth graders and college sophomores were significantly more self-focused than eighth or tenth graders and females scored higher than males.

The results in Table 13 in agreement with the Enright, Lapsley and Shukla research of 1979 reveal no significant relationship between the total egocentrism score and grade. However, on the subscale of imaginary audience, a significant negative relationship \( r = -0.20, p < .02 \) suggests that as grade increases, there is a very slight
Table 13
The Relationship Between Egocentrism and Grade and Sex

<table>
<thead>
<tr>
<th></th>
<th>Grade</th>
<th>Sex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egocentrism</td>
<td>.003</td>
<td>-.14**</td>
</tr>
<tr>
<td>Imaginary Audience</td>
<td>-.195**</td>
<td>-.10</td>
</tr>
<tr>
<td>Personal Fable</td>
<td>.02</td>
<td>-.11</td>
</tr>
<tr>
<td>Self-focus</td>
<td>.219*</td>
<td>-.14</td>
</tr>
</tbody>
</table>

*p < .01

**p < .05
decrease in the imaginary audience concept. This finding agrees with the two previous studies by Enright, Lapsley, and Shukla (1979) and Enright, Shukla, and Lapsley (1980). As students advance into the higher grades, it appears they do not feel as scrutinized by others nor that they are constantly "on stage". Also a significant relationship \( (r = .22, p < .01) \) was found between grade and self-focus indicating that as students advance in grade, their focus on self increases. This finding agrees with the Enright, Lapsley, and Shukla study of 1979. More research is necessary in this area before final conclusions can be drawn. This study differed from the previous research mentioned in that on the total egocentrism scale, males were found to score significantly higher than females although the difference was slight. Sex was not found to be significantly related to any of the subscales of egocentrism.

**Multiple Regression Analysis**

The research hypothesis under investigation suggested that higher levels of formal operations and grade and lower levels of egocentrism would be associated with higher levels of ego identity. Sex was also included as a variable since research has shown that males tend to score higher in formal operations and lower in egocentrism. Step-wise multiple regression was used to determine the predictive value of the regression model.

**Ego Identity.** The regression model under investigation was as follows:

\[
y_1 = b_0 + b_{11}X_1 + b_{22}X_2 + b_{33}X_3 + b_{44}X_4
\]

where \( Y = \text{ego identity (summary Status Score)} \)
As indicated from the analysis in Table 14, the independent variable selected at Step 1 was grade in school as it was most highly correlated with ego identity \( r = .455 \), significantly explaining 21 percent of the variance. The variable entered at Step 2 was formal operations which did not significantly account for any additional variance in ego identity because grade and formal operations were significantly correlated \( r = .478, p < .01 \) with each other and with ego identity \( r = .467, p < .001, r = .333, p < .001 \), respectively. Sex entered at Step 3 and egocentrism entered at Step 4 with neither significantly explaining additional variance in ego identity. The regression model for \( Y_1 \) explained 23 percent of the total variance in ego identity. The data support the hypothesis and previous research (Archer, 1980; LaVoie, 1976; Meilman, 1979; Protinsky, 1975; Stark and Traxler, 1975 and Wagner, 1976) that as grade increases, ego identity increases significantly. It appears that more sophisticated ego identity activity takes place in later adolescence. This research substantiates the assumptions drawn by Erikson (1968) that adolescence is a unique developmental period in the human life cycle in which the young person, as he moves through the epigenetic sequence, gains increased awareness and insight regarding goals, philosophies, and self-other relationships.
Table 14
Regression Analysis $Y_1$ -
Ego Identity (Summary Status Score)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Multiple R</th>
<th>Variance Explained</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1 Grade</td>
<td>.455</td>
<td>.207</td>
</tr>
<tr>
<td>Step 2 Formal Operations</td>
<td>.474</td>
<td>.225</td>
</tr>
<tr>
<td>Step 3 Sex</td>
<td>.478</td>
<td>.228</td>
</tr>
<tr>
<td>Step 4 Egocentrism</td>
<td>.479</td>
<td>.229</td>
</tr>
</tbody>
</table>
Regression models were also calculated for subscales of the formal operations and egocentrism measurements as predictors of ego identity and the four areas of ego identity. Therefore:

\[
y_2 = B_0 + B_1 x_1 + B_2 x_2 + B_3 x_3 + B_4 x_4 + B_5 x_5 + B_6 x_6 + B_7 x_7 + B_8 x_8 + B_9 x_9 + B_{10} x_{10} + B_{11} x_{11}
\]

where \( y_2 \) = ego identity (Summary Status Score)

\[ x_1 = \text{grade} \]

\[ x_2 = \text{sex} \]

\[ x_3 = \text{hypothetical reasoning} \]

\[ x_4 = \text{proportional reasoning} \]

\[ x_5 = \text{syllogistic reasoning} \]

\[ x_6 = \text{propositional reasoning} \]

\[ x_7 = \text{correlational reasoning} \]

\[ x_8 = \text{analogue reasoning} \]

\[ x_9 = \text{imaginary audience} \]

\[ x_{10} = \text{personal fable} \]

\[ x_{11} = \text{self-focus} \]

Analysis of the hypothesized regression model for \( y_2 \) (Table 15) reveals that grade again entered at Step 1 as the only significant predictor of the variance in ego identity and that none of the other independent variables significantly contributed to the unexplained variance in that they were either not significantly related or the relationship was not strong enough for predictive value. The total regression model \( y_2 \) explained 25 percent of the total variance in ego identity.
Table 15
Regression Analysis $Y_2$ -
Ego Identity (Summary Status Score)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Multiple R</th>
<th>Variance Explained</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1 Grade</td>
<td>.455</td>
<td>.207</td>
</tr>
<tr>
<td>Step 2 Analogical Reasoning</td>
<td>.478</td>
<td>.227</td>
</tr>
<tr>
<td>Step 3 Correlational Reasoning</td>
<td>.482</td>
<td>.232</td>
</tr>
<tr>
<td>Step 4 Sex</td>
<td>.487</td>
<td>.237</td>
</tr>
<tr>
<td>Step 5 Personal Fable</td>
<td>.490</td>
<td>.240</td>
</tr>
<tr>
<td>Step 6 Self-focus</td>
<td>.498</td>
<td>.247</td>
</tr>
<tr>
<td>Step 7 Imaginary Audience</td>
<td>.500</td>
<td>.249</td>
</tr>
<tr>
<td>Step 8 Propositional Reasoning</td>
<td>.501</td>
<td>.251</td>
</tr>
<tr>
<td>Step 9 Hypothetical Reasoning</td>
<td>.503</td>
<td>.253</td>
</tr>
<tr>
<td>Step 10 Syllogistic Reasoning</td>
<td>.503</td>
<td>.253</td>
</tr>
<tr>
<td>Step 11 Proportional Reasoning</td>
<td>.503</td>
<td>.253</td>
</tr>
</tbody>
</table>
**Vocational Identity.** Regression model $Y_3$ is as follows:

$$Y_3 = B_0 + B_1 X_1 + B_2 X_2 + B_3 X_3 + B_4 X_4 + B_5 X_5 + B_6 X_6 + B_7 X_7 + B_8 X_8 + B_9 X_9 + B_{10} X_{10} + B_{11} X_{11}$$

where $Y_3 =$ vocational identity

$X_1 =$ grade

$X_2 =$ sex

$X_3 =$ hypothetical reasoning

$X_4 =$ proportional reasoning

$X_5 =$ syllogistic reasoning

$X_6 =$ propositional reasoning

$X_7 =$ correlational reasoning

$X_8 =$ analogical reasoning

$X_9 =$ imaginary audience

$X_{10} =$ personal fable

$X_{11} =$ self-focus

In Table 16 the analysis of regression model $Y_3$ reveals that grade again entered at Step 1, significantly explaining 14 percent of the variance in vocational identity. The variable entered at Step 2 was self-focus, which, when added to grade, significantly explained 21 percent of the variance in vocational identity. Therefore analysis of regression model $Y_3$ indicates that as grade increases and self-focus decreases, young people can more effectively plan and work toward career goals. As adolescents grow older and turn their focus off self and to society, they can more objectively form career goals. None of the other independent variables significantly predicted vocational identity.
Table 16

Regression Analysis $Y_3$ - Vocational Identity

<table>
<thead>
<tr>
<th>Variance</th>
<th>Multiple R</th>
<th>Variance Explained</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1 Grade</td>
<td>.374</td>
<td>.140</td>
</tr>
<tr>
<td>Step 2 Self-focus</td>
<td>.459</td>
<td>.210</td>
</tr>
<tr>
<td>Step 3 Hypothetical Reasoning</td>
<td>.473</td>
<td>.224</td>
</tr>
<tr>
<td>Step 4 Personal Fable</td>
<td>.482</td>
<td>.232</td>
</tr>
<tr>
<td>Step 5 Imaginary Audience</td>
<td>.487</td>
<td>.237</td>
</tr>
<tr>
<td>Step 6 Propositional Reasoning</td>
<td>.490</td>
<td>.240</td>
</tr>
<tr>
<td>Step 7 Sex</td>
<td>.493</td>
<td>.243</td>
</tr>
<tr>
<td>Step 8 Correlational Reasoning</td>
<td>.496</td>
<td>.246</td>
</tr>
<tr>
<td>Step 9 Proportional Reasoning</td>
<td>.497</td>
<td>.247</td>
</tr>
<tr>
<td>Step 10 Analogical Thinking</td>
<td>.498</td>
<td>.248</td>
</tr>
<tr>
<td>Step 11 Syllogistic Thinking</td>
<td>.499</td>
<td>.249</td>
</tr>
</tbody>
</table>
as they were either not significantly related or the relationships were not strong enough to allow for prediction. The research conclusion of regression model $Y_3$ that vocational identity increases with age therefore lends further support to previous research among college students (Waterman and Waterman, 1971; Waterman, Geary and Waterman, 1974). However, Archer (1980) did not find significant differences in vocational identity status by grade level possibly because her sample consisted only of junior and senior high school students. The analysis of regression model $Y_3$ substantiates Erikson's (1959, 1968) theory that adolescence is a pivotal and critical time in which young people resolve conflict and prepare for productive adult roles in society. The research finding in regression model $Y_3$ that as self-focus decreases vocational identity increases, supports the theoretical assumptions of David Elkind (1967, 1974) regarding adolescent social behavior in which the young adolescent is viewed as primarily concerned and preoccupied with self but through the decentering process develops a more realistic appraisal and integration of self with society and its demands. No previous research has investigated the relationship between the concepts of egocentrism and vocational identity.

**Religious Identity.** The regression model for $Y_4$ is as follows:

$$Y_4 = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + B_5X_5 + B_6X_6 + B_7X_7 + B_8X_8 + B_9X_9 + B_{10}X_{10} + B_{11}X_{11}$$

where $Y_4 = $ religious identity

$X_1 = $ grade

$X_2 = $ sex

$X_3 = $ hypothetical reasoning

$X_4 = $ proportional reasoning
Regression model \( Y_4 \) (Table 17) explained 15 percent of the total variance in religious identity with proportional reasoning entering on Step 1 and significantly explaining 7 percent of the variance in religious identity. Inhelder and Piaget (1958) stated that it is through the tasks that require a concept of proportionality that evidence for the presence of formal operations can be found and that once an adolescent has attained formal operations his reactions to a variety of situations including morality, religion, and identity will become more self-defined. No significant predictive values resulted when the other independent variables were added to proportional reasoning as predictors of religious identity. Grade in school entered on Step 5 and was not a significant predictor of religious identity. Among college students Waterman and Waterman (1971) and Waterman, Geary, and Waterman (1974) found no increase in identity within the religious area during the college years at a polytechnical institute or liberal arts college. Archer (1980) found a significant difference in identity status and grade in the religious beliefs area with the largest number of diffusions occurring in the tenth
Table 17

Regression Analysis \( Y_4 \) - Religious Identity

<table>
<thead>
<tr>
<th>Step</th>
<th>Variable</th>
<th>Multiple R</th>
<th>Variance Explained</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proportional Reasoning</td>
<td>.264</td>
<td>.070</td>
</tr>
<tr>
<td>2</td>
<td>Correlational Reasoning</td>
<td>.310</td>
<td>.010</td>
</tr>
<tr>
<td>3</td>
<td>Sex</td>
<td>.349</td>
<td>.121</td>
</tr>
<tr>
<td>4</td>
<td>Personal Fable</td>
<td>.364</td>
<td>.132</td>
</tr>
<tr>
<td>5</td>
<td>Grade</td>
<td>.373</td>
<td>.139</td>
</tr>
<tr>
<td>6</td>
<td>Propositional Reasoning</td>
<td>.380</td>
<td>.145</td>
</tr>
<tr>
<td>7</td>
<td>Analogical Reasoning</td>
<td>.388</td>
<td>.150</td>
</tr>
<tr>
<td>8</td>
<td>Hypothetical Reasoning</td>
<td>.388</td>
<td>.151</td>
</tr>
<tr>
<td>9</td>
<td>Imaginary Audience</td>
<td>.389</td>
<td>.151</td>
</tr>
<tr>
<td>10</td>
<td>Self-focus</td>
<td>.390</td>
<td>.152</td>
</tr>
</tbody>
</table>
grade. More research is needed in the religious area of ego identity to draw firm conclusions. It appears that the adolescents who have more logically and abstractly dealt with proportions and ratios have also questioned the religious aspects of their lives and formed their own individual ideas and opinions regarding a religious orientation. No previous research has investigated the concepts of formal operations and religious identity per se.

In viewing the religious identity summary table, it is interesting to note that the independent variable of personal fable was not a significant contributor in explaining religious identity. David Elkind (1979) stated that evidence for the presence of the personal fable is the tendency to confide in a personal God and that because of the belief in personal uniqueness adolescents establish an "I-Thou" relationship with God and look for divine guidance. According to Table 17, religious identity was not predicted from the personal fable concept.

**Political Identity.** The regression model for political identity is:

\[
Y_5 = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + b_5 X_5 + b_6 X_6 + b_7 X_7 + b_8 X_8 + b_9 X_9 + b_{10} X_{10} + b_{11} X_{11}
\]

where

- \( Y_5 \) = political identity
- \( X_1 \) = grade
- \( X_2 \) = sex
- \( X_3 \) = hypothetical reasoning
- \( X_4 \) = proportional reasoning
- \( X_5 \) = syllogistic reasoning
- \( X_6 \) = propositional reasoning
In Table 18, the regression analysis for $Y_5$ (political identity) reveals that the regression model explained 18 percent of the total variance of political identity, with grade entering on Step 1 and sex entering on Step 2 and together significantly explaining 13 percent of the total variance in political identity. The data suggest that adolescents develop a political orientation as they get older and that males tend to form more firm opinions regarding politics than females. Regarding political identity in college students, Waterman and Waterman (1971) found an increase in achievements and a decrease in diffusions over four years at a liberal arts school but Waterman, Geary, and Waterman (1974) found no such increase at a polytechnic school. Archer (1980), assessing political identity among junior and senior high school students, found that diffusions decreased significantly with increase in grade level and foreclosures increased. Maturatoriums and achievements were eliminated due to low cell frequency. Archer (1980) found no significant sex differences in any content area regarding identity status. Regression model $Y_5$ is consistent with the implications drawn from Erikson's (1950, 1959, 1968) psychosocial theory in that females are viewed as eventually assuming standardized roles of wife and mother and deferring or approaching
Table 18

Regression Analysis Y₅ - Political Identity

<table>
<thead>
<tr>
<th>Variance</th>
<th>Multiple R</th>
<th>Variance Explained</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1 Grade</td>
<td>.302</td>
<td>.091</td>
</tr>
<tr>
<td>Step 2 Sex</td>
<td>.358</td>
<td>.128</td>
</tr>
<tr>
<td>Step 3 Correlational Reasoning</td>
<td>.382</td>
<td>.146</td>
</tr>
<tr>
<td>Step 4 Imaginary Audience</td>
<td>.403</td>
<td>.162</td>
</tr>
<tr>
<td>Step 5 Analogical Thinking</td>
<td>.407</td>
<td>.166</td>
</tr>
<tr>
<td>Step 6 Hypothetical Thinking</td>
<td>.412</td>
<td>.170</td>
</tr>
<tr>
<td>Step 7 Propositional Reasoning</td>
<td>.415</td>
<td>.172</td>
</tr>
<tr>
<td>Step 8 Personal Fable</td>
<td>.419</td>
<td>.175</td>
</tr>
<tr>
<td>Step 9 Syllogistic Reasoning</td>
<td>.419</td>
<td>.176</td>
</tr>
<tr>
<td>Step 10 Self-focus</td>
<td>.420</td>
<td>.176</td>
</tr>
<tr>
<td>Step 11 Proportional Reasoning</td>
<td>.420</td>
<td>.177</td>
</tr>
</tbody>
</table>
in a tentative manner many of the decisions such as ideological
commitments, that males are expected to confront and resolve at an
earlier age.

**Sex-Role Identity.** The regression model for sex-role identity
is:

\[ y_6 = B_0 + B_1 x_1 + B_2 x_2 + B_3 x_3 + B_4 x_4 + B_5 x_5 + B_6 x_6 + B_7 x_7 + B_8 x_8 + B_9 x_9 + B_{10} x_{10} + B_{11} x_{11} \]

where $y_6$ = sex-role identity

$x_1$ = grade

$x_2$ = sex

$x_3$ = hypothetical reasoning

$x_4$ = proportional reasoning

$x_5$ = syllogistic reasoning

$x_6$ = propositional reasoning

$x_7$ = correlational reasoning

$x_8$ = analogical reasoning

$x_9$ = imaginary audience

$x_{10}$ = personal fable

$x_{11}$ = self-focus

In Table 19, the regression model explained 14 percent of the
total variance in sex-role identity with grade again entering on
Step 1 as the only significant, predictive independent variable,
explaining 9 percent of the variance in sex-role identity. From the
data, it appears that the older the adolescent, the more he or she
will have thought about sex-role identity and drawn more firm con-
cclusions. Archer (1980) found no significant differences in identity
Table 19

Regression Analysis $Y_6$ - Sex Role Identity

<table>
<thead>
<tr>
<th>Variance</th>
<th>Multiple R</th>
<th>Variance Explained</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1 Grade</td>
<td>.304</td>
<td>.093</td>
</tr>
<tr>
<td>Step 2 Sex</td>
<td>.316</td>
<td>.100</td>
</tr>
<tr>
<td>Step 3 Propositional Reasoning</td>
<td>.328</td>
<td>.107</td>
</tr>
<tr>
<td>Step 4 Imaginary Audience</td>
<td>.340</td>
<td>.115</td>
</tr>
<tr>
<td>Step 5 Hypothetical Thinking</td>
<td>.347</td>
<td>.120</td>
</tr>
<tr>
<td>Step 6 Proportional Reasoning</td>
<td>.358</td>
<td>.128</td>
</tr>
<tr>
<td>Step 7 Correlational Reasoning</td>
<td>.366</td>
<td>.134</td>
</tr>
<tr>
<td>Step 8 Personal Fable</td>
<td>.371</td>
<td>.137</td>
</tr>
<tr>
<td>Step 9 Self-focus</td>
<td>.375</td>
<td>.141</td>
</tr>
<tr>
<td>Step 10 Syllogistic Thinking</td>
<td>.379</td>
<td>.144</td>
</tr>
</tbody>
</table>
status by grade level in the sex-role content area. The statistical
analysis used by Archer resulted in eliminating moratoriums because
of low cell frequency. Therefore, comparisons are difficult to make
and further research is recommended. Regression model $Y_6$ supports
Erikson's (1950, 1959, 1968) assumption that the adolescent sorts
through and synthesizes childhood identifications in order to con-
struct viable social roles and expectations.

**Overall Identity Status Assigned.** As mentioned previously, be-
side assigning an ego identity Summary Status Score, an Overall Ego
Identity Status was assigned. The multiple regression model for the
overall identity status is:

$$Y_7 = B_0 + B_1 X_1 + B_2 X_2 + B_3 X_3 + B_4 X_4 + B_5 X_5 + B_6 X_6 + B_7 X_7 + B_8 X_8 + B_9 X_9 + B_{10} X_{10} + B_{11} X_{11}$$

where $Y_7 = $ ego identity (Overall Assigned Status)

$X_1 = $ grade

$X_2 = $ sex

$X_3 = $ hypothetical reasoning

$X_4 = $ proportional reasoning

$X_5 = $ syllogistic reasoning

$X_6 = $ propositional reasoning

$X_7 = $ correlational reasoning

$X_8 = $ analogical reasoning

$X_9 = $ imaginary audience

$X_{10} = $ personal fable

$X_{11} = $ self-focus
In Table 20, regression model $Y_7$ explained 19 percent of the total variance in overall identity status and grade again entered on Step 1 as the only significant predictor, explaining 15 percent of the variance. When Table 20 (Ego Identity—Overall Assigned Status) is compared to Table 15 (Ego Identity—Summary Status Score), it can be seen that the Summary Status Score of ego identity allows for more of the total variance to be explained than the Overall Assigned Status. Of interest is the fact that for both methods of computing ego identity, grade and analogical reasoning are the most important predictive variables, but only grade is a significant predictor in both regression models.

In order to summarize the results of the various regression models, Table 21 has been developed.

**Summary and Discussion of Regression Models**

The data in Table 21 indicate that in all areas of ego identity, grade enters on Step 1 and is the most significant predictor in all the regression models except that of religious identity ($Y_4$), and that grade explains from 9 percent to 21 percent of the variance in ego identity. Self-focus, with grade, is also a significant contributing predictor to vocational identity. Sex and grade are significant predictors of political identity. Proportional reasoning is the only significant predictor of religious identity, but explains very little of the variance. From Table 21, it can be surmised that grade, sex, and the proportional reasoning concept of the Formal Operations Instrument and the Self-Focus subscale of the Adolescent Egocentrism-Socio—
Table 20
Regression Analysis $Y_7$ - Overall Assigned Status

<table>
<thead>
<tr>
<th>Variance</th>
<th>Multiple R</th>
<th>Variance Explained</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1 Grade</td>
<td>.390</td>
<td>.148</td>
</tr>
<tr>
<td>Step 2 Analogical Thinking</td>
<td>.410</td>
<td>.167</td>
</tr>
<tr>
<td>Step 3 Sex</td>
<td>.421</td>
<td>.177</td>
</tr>
<tr>
<td>Step 4 Syllogistic Thinking</td>
<td>.427</td>
<td>.183</td>
</tr>
<tr>
<td>Step 5 Proportional Reasoning</td>
<td>.431</td>
<td>.186</td>
</tr>
<tr>
<td>Step 6 Self-focus</td>
<td>.433</td>
<td>.188</td>
</tr>
<tr>
<td>Step 7 Personal Fable</td>
<td>.438</td>
<td>.192</td>
</tr>
<tr>
<td>Step 8 Propositional Thinking</td>
<td>.439</td>
<td>.192</td>
</tr>
<tr>
<td>Step 9 Hypothetical Thinking</td>
<td>.439</td>
<td>.192</td>
</tr>
</tbody>
</table>
Table 21
Analysis of Regression Models - Summary

<table>
<thead>
<tr>
<th>Regression Model</th>
<th>Dependent Variable</th>
<th>Significant Independent Variable Predictor and %</th>
</tr>
</thead>
<tbody>
<tr>
<td>$Y_1$</td>
<td>Ego Identity</td>
<td>Grade - 21%</td>
</tr>
<tr>
<td></td>
<td>Summary Status Score</td>
<td></td>
</tr>
<tr>
<td>$Y_2$</td>
<td>Ego Identity</td>
<td>Grade - 21%</td>
</tr>
<tr>
<td></td>
<td>Summary Status Score</td>
<td></td>
</tr>
<tr>
<td>$Y_3$</td>
<td>Vocational Identity</td>
<td>Grade - 14% with Self-Focus - 21%</td>
</tr>
<tr>
<td>$Y_4$</td>
<td>Religious Identity</td>
<td>Proportional Reasoning - 7%</td>
</tr>
<tr>
<td>$Y_5$</td>
<td>Political Identity</td>
<td>Grade - 9%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>with Sex - 13%</td>
</tr>
<tr>
<td>$Y_6$</td>
<td>Sex-Role Identity</td>
<td>Grade - 9%</td>
</tr>
<tr>
<td>$Y_7$</td>
<td>Ego Identity</td>
<td>Grade - 9%</td>
</tr>
<tr>
<td></td>
<td>Overall Assigned Status</td>
<td></td>
</tr>
</tbody>
</table>
centrism Scale predict ego identity to some extent. The most total variance explained by any of the regression models (Y₂ and Y₃) is 25 percent.

**Significance of Regression Models**

All of the regression models (Y₁ to Y₇) are significant at the .05 level at Step 1 with grade significantly explaining the variance in ego identity in six of the seven regression models. Two of the models, Y₃ (vocational identity) and Y₅ (political identity) are also significant at the .05 level at Step 2 with self-focus and sex, respectively, contributing significantly in explaining the variance in areas of ego identity. From a statistical and practical standpoint regression models Y₁, Y₂, and Y₃ are accepted as significant and important regression models in predicting ego identity. Regression models Y₄ thru Y₇ are rejected as predictive regression models because to base any firm conclusions on predictive values that explain such a small amount of the variance in ego identity would not be practical. As ego identity has been verified to increase with age or grade in many studies, perhaps from a practical standpoint, the regression model of most importance is Y₃ in which grade and self-focus explained 21 percent of the variance in vocational identity, indicating that as students move up in grade and decrease the self-focus of egocentrism they move forward in vocational plans and goals. Therefore, stepwise multiple regression model Y₃ characterizes adolescents who are advancing in vocational identity as being in the upper grades in school or in college and as being more socially focused than self-focused.
CHAPTER V
SUMMARY AND DISCUSSION

According to Erikson (1968) and Piaget (1972), formal operations allow the adolescent to consider a host of alternatives in determining societal ideologies and obligations, and as formal operations become more firmly established, adolescent egocentrism decreases (Elkind, 1979). Rachman further stated that self-knowledge and realization of individual needs lead to an integration and stability in the personality dynamic referred to by Erik Erikson as ego identity. Therefore, the purpose of this research was to determine the relationship and predictive values between ego identity and formal operations, egocentrism, grade, and sex. The initial hypothesis was that ego identity status could be predicted from measures of formal operations, egocentrism, grade and sex. Regression models were also developed for the subcategories of the criterion and independent variables.

Significant Relationships

It was assumed in this study that significant relationships existed between ego identity and formal operations, egocentrism, grade and sex.

The conclusions regarding relationships among major variables were as follows (see Table 8):

1. There was a significant positive relationship ($r = .336$, $p < .01$) between formal operations and ego identity.
2. There was a significant positive relationship ($r = .445$, $p < .01$) between grade and ego identity.
3. There was no significant relationship between egocentrism and ego identity.

4. There was no significant relationship between sex and ego identity.

The research conclusions regarding relationships of the four subcategories of ego identity (vocation, religion, politics, and sex role) and the major independent variables were as follows (see Table 8):

1. There were significant positive relationships between formal operations and all four subcategories of ego identity.

2. There were significant positive relationships between grade and all four subcategories of ego identity.

3. There was a significant negative relationship ($r = -.179$, $p < .05$) between egocentrism and vocational identity.

4. There was a significant relationship ($r = .192$, $p < .05$) between sex and political identity, with males scoring higher than females.

The research conclusions regarding relationships of the four subcategories of ego identity (vocation, religion, politics, and sex role) and various subscales of the independent variables were:

1. Many of the concepts of the Piaget Formal Operations Inventory were significantly related to vocational and religious identity, but few were significantly related to political identity and only one was significantly related to sex role identity (see Table 9).

2. There were significant negative relationships between imaginary audience ($r = -.208$, $p < .05$) and self-focus ($r = -.178$, $p < .05$) with regard to vocational identity (see Table 10).
3. There was a significant positive relationship ($r = .484$, $p < .01$) between grade and formal operations (see Table 11).

4. No significant relationship was determined between grade and egocentrism (see Table 12).

5. There was no significant relationship between formal operations and egocentrism (see Table 12).

6. There was a significant negative relationship ($r = -.195$, $p < .05$) between grade and the egocentrism subscale of imaginary audience (see Table 13).

7. There was a significant positive relationship ($r = .219$, $p < .01$) between grade and the egocentrism subscale of self-focus (see Table 13).

8. There was no significant relationship between grade and the egocentrism subscale of personal fable (see Table 13).

**Predictive Values**

This study also assumed that the relationships between the criterion variable, ego identity, and the independent variables of formal operations, egocentrism, grade and sex would be strong enough to have predictive value. For all practical purposes, regression models $Y_1$, $Y_2$, and $Y_3$ were accepted as significantly predicting the variance in ego identity. Increase in grade was the most common significant predictor of variance in ego identity, explaining from 9 percent ($Y_5$) to 21 percent of the variance ($Y_1$). Scores on the various concepts of the Piagetian Formal Operations Instrument and scores on the subscales of the Adolescent Egocentrism-Sociocentrism Scale, with grade and sex explained 25 percent of the total variance in ego identity ($Y_2$). Twenty-
one percent of the variance in vocational identity (Y3) was explained by an increase in grade and a decrease in Self-focus.

In summary, ego identity was found to be significantly related to formal operations, but the relationship was not strong enough to follow for prediction. After grade went into the regression models on Step 1 as the variable most highly correlated with ego identity, formal operations did not significantly predict any additional variance because grade and formal operations were both moderately related to ego identity and both are apparently explaining some of the change that takes place during adolescence. Also, the ego identity content areas of politics and sex-role were not as frequently significantly correlated with the concepts of the PFOI as the subcategories of vocational and religious identity.

Of the four ego identity subcategories researched, vocational identity appears to be the most salient to young people at this time. Archer (1980) also stated that the majority of instances of identity achievement and moratorium were in vocational choice, with a large percentage diffused in politics, and foreclosed in religion and sex role. This study agrees with and parallels the findings by Archer in 1980 (see Table 3). The diffusion and foreclosed statuses were most evident in all content areas (vocation, religion, politics, and sex-role) in the present research and in research by Archer (1980). According to Adelson (1980), there are some periods and some areas of an individual's life that are more crucial than others. A well-developed identity structure is flexible and open to changes in society and to crises in relationships (Adelson, 1980). The conclusions of this
research substantiates the fact that different ego identity content areas are experienced as crisis areas at different times and that identity formation does not happen neatly and involves as much regulation as it does affirmation. The adolescent ideally eventually comes to relinquish parents as introjects, childhood fantasies, and unrealistic dreams of a glamorous life-style as the progression is made in negating the subjectively accepted known in search of the unknown in arriving at realistic philosophies. Identity formation usually proceeds a little at a time, getting done in bits and pieces and may not be nearly as predictive as adults might wish (Adelson, 1980).

Therefore, as a person progresses through childhood and adolescence, there are many variables that affect ego identity in the four areas of vocation, religion, politics, and sex role. It is important in understanding adolescents to know that grade is a significant contributor to the identity process, and that various aspects of formal operations and egocentrism play a part in the progression toward formation of a coherent and stable ego identity. It is especially helpful to know that once an adolescent can disentangle himself from the egocentrism of adolescence and become less preoccupied with appearance and focus on self that new strides will be made in vocational identity as the adolescent can more realistically plan toward career goals.

Implications and Recommendations

Ego Identity. The present research reveals that approximately 25 percent of the variance in ego identity can be explained by formal
operations, egocentrism, grade and sex, with grade being the major contributing variable. Therefore, 75 percent of the variance in ego identity is unexplained. As many young people today are confused regarding values and goals for their lives (Rachman, 1975), it is recommended that other factors that affect ego identity be investigated. One area of investigation that has been researched very little is that of family life and the nature of relationships among family members. The ideal research regarding ego identity would involve longitudinal studies with a consistent interview and scoring format, and agreed upon dependent variables measured consistently among different populations so that comparisons can be drawn in a systematic fashion over a certain time span. Ego identity is a useful educational and clinical concept that can be measured reliably and related to many current variables to gain insight into the changes that occur during adolescence, thereby allowing for prediction and a certain amount of control regarding adolescent identity formation.

Ego Identity and Formal Operations. The results of this study indicate that as formal operations increase the adolescent will tend to move forward in the ego identity process. These results also suggest the importance of parents, teachers and others involved with young people realizing that until adolescents enter the cognitive stage of formal operations they will hesitate or refuse to accept evidence contrary to their beliefs. As the adolescent gains the ability to distinguish between assumptions and hypotheses based on empirical evidence, he also gains the recognition that many of his hypotheses are wrong which gives him a respect for objective evidence
and a diminished confidence in his own subjective judgment. A reduction in what Elkind (1979) refers to as adolescent cognitive conceit (the young adolescent seeing himself as very clever and knowing more than adults) naturally follows but, at the same time, and in agreement with Erikson (1956, 1968), this research suggests that the adolescent then begins a period of self-discovery as he searches for and forms his own unique philosophy of life. Marcia (1966), defines this period as a crisis period in which the adolescent, as he progresses toward a stable and integrated ego identity, questions the values and ideas he has formed thus far, reevaluates them, and commits to his own individual conception regarding society and his place in it.

Parents especially feel threatened during this time as many of the values they hold will be questioned and reexamined time and again, but it is in the acceptance that this crisis period is necessary in order for the identity of the young person to be uniquely his own that parents can find solace and a sense of pride as they allow the psychosocial progression to continue.

**Vocational Identity and Age.** One of the major conclusions drawn from the interpretation of the research is that vocational identity increases with age, and that many attempts to speed up the progression will not be helpful but may have the potential to be harmful. Young children in elementary schools are presented with career information and guidance and have career days with various fields of employment represented. If career guidance at the elementary school level or in the home is presented too seriously, students may feel pressured to make choices or feel that they should have career goals in mind. This
may result in becoming foreclosed in vocational identity, and the moratorium period of realistically considering and searching out alternatives may be eliminated.

According to Isaacson (1977), work provides physical and psychological sustenance, affiliation with society, status within a group, and determines the lifestyle of the individual and the family. One study reported by Isaacson (1977) revealed that almost 60 percent of the problems brought to a free counseling community center involved vocational problems. A study by Flanagan (1973) revealed that quite unrealistic and unstable career choices were made by high school students in 1960. The successful resolution of vocational identity in adolescence appears pertinent to lifetime successes.

In junior high and senior high school as the students move toward more realistic formal thinking, perhaps the emphasis should be on considering all probable careers and finding all pertinent information before decisions are made. Actually visiting with someone experienced in the chosen field would be preferable in decision-making. Just as most schools allow a college day to search out the college of choice, perhaps a career day of visiting in a certain field could be allowed in determining the career of choice. As much information as possible regarding self (interests, aptitudes, ability, values) and the outside world is necessary in considering all alternatives regarding vocation before decisions are made.

Vocational Identity and Formal Operations. This research suggests that as the adolescent moves into formal operations he begins to set goals based on reality and begins to measure himself according
to adult standards, especially in the area of vocation. The grandiose ideas of youthfulness give way to reality as the young person more realistically considers hypotheses and deductively selects the vocational field that meets his own needs. The research findings support more awareness and consideration of developmental stages as an integral part of joining society.

Vocational Identity and the Egocentrism Concepts of Imaginary Audience and Self-focus. The present study suggests that once the egocentric concepts of the imaginary audience and self-focus are diminished, young people move progressively toward the expectations of society regarding vocation. As the adolescent gradually comes to recognize the difference between self-preoccupations and the interest and concern of others, he can hear and deal with different ideas regarding vocation and not be stubbornly rejecting information that leads him in a different path from what he has subjectively chosen. The present research implies the necessity of parents, teachers, and counselors respecting egocentrism in adolescents. It appears that unless there is an understanding of the preoccupations of adolescents with self and fantasy, adults may guide, but young adolescents are not capable of listening and following until the aspect of self is resolved to some extent at least. It is recommended that further research be conducted regarding the concept of egocentrism as to valid dimensions and operational definitions. Longitudinal studies would yield more valid information. Also more reliable measurement of ego-centrism is necessary.
As ego identity in the area of vocation was predicted to some extent by a decline in self-focus, it is recommended that research be conducted to further investigate the relationship between self-focus and vocational identity with the possible intent of discovering methods of reducing self-focus in adolescence and hopefully thereby allowing the adolescent to gain his unique place in society.

Religion and Sex Role Identity. The research conclusions of this study are that many young people are introjecting parental or other authoritative influences regarding religion and sex-role behavior rather than going through a questioning or crisis period and coming to their own conclusions and making their own commitments. Teachers, counselors and therapists are often aware that individual decisions and commitments are either not attempted or allowed by adolescents. Parents, often in the attitude of being helpful and protective, do not allow young people to make any of their own decisions or suffer the consequences of behavior and thereby learn from experience. Dreikurs (1964) refers to the enormous difference between teaching discipline and teaching responsibility. The areas of religion and sex role identity are two areas that might be incorporated into parenting classes when discussions involving adolescent behavior occur.

Political Identity. The large percentage of diffused subjects in political identity reveals that many young people are not interested, involved, or oriented toward politics, which is probably not surprising in itself. However, it is unusual, to some extent, when considering the social studies, government, and economics classes offered to junior and senior high school students. Apparently the
educational system and families have not been effective in interesting young people enough in politics so that they question or commit to many issues. Perhaps, too, as adolescents actually experience societal demands and obligations as they move into the world of work and family responsibilities, political issues will become more intrinsically part of their lives. It is recommended that investigation be made regarding the political apathy discovered in this study. Perhaps researchers should consider that the predominant concerns of most adolescents are not with global governmental issues and that a redefinition and assessment of political identity in relation to the adolescent's involvement in his present social situations and environment be considered rather than governmental issues.

In summary, there are many implications from this research that help understand adolescents more as an entity and not just as one part. Adolescents often confuse adults because it appears they have several personalities. In reality, a synthesis is taking place in many areas of development. Especially, the adolescent is gaining in cognitive abilities and psychosocial behaviors which may be perplexing and sometimes frustrating for adults. It is important to understand and remember that as the structures of personality begin to fall into place, the young adolescent does not yet have a realistic view of the environment or himself in it, but once formal operations develop more fully and the focus is on others, as well as self, great strides will be made by the young person in seeking a place in today's world with goals and philosophies determined to some extent by the cognitive structures available. A major conclusion of this research
is that the passage from adolescence to adulthood is a complex process which creates many questions that need further research.

Limitations

One limitation of this research is that subjects were drawn from an available or convenient sample from one junior and senior high school and community college, rather than from a random sample from many schools and classes. Also two of the independent variables (formal operations and grade) were moderately correlated with each other and ego identity, which limits the predictive ability of one or both variables. There is also the limitation of subjects giving socially acceptable responses on the Ego Identity Interview. The three raters were all female which may have prejudiced some responses.

Another limitation is that ego identity, even though operationalized from Erikson's theory by James Marcia (1964, 1966) into more realistic terms is still a somewhat abstract concept as it refers to an existential position affected by inner needs and conflicts, and is organized to some extent by the social environment. The adolescent ego identity process actually begins in infancy and, as a recapitulation process, is affected by crises and resolutions of previous stages. Also in adolescence a synthesis is taking place in that physical, sexual, cognitive, and social development coincides in the pathway to adulthood. The different developmental processes affect and are affected by identity formations and researchers must be sensitive to many variables which influence ego identity formation. It may be unrealistic to some extent to treat ego identity as a single
variable as adolescents undergo a series of crises and at any one point in time may be stable in one content area and unstable in another.

Further complications arise when considering the fact that identity structure appears to be dynamic, rather than static as once thought. While researchers often look at the content of individual identities, what may be of more importance is the process and flux involved in the identity process which can best be evaluated by a longitudinal rather than cross-sectional study.

Marcia (1980) states that another limitation in research on ego identity and formal operations is the imperfect validity of measures for both ego identity and formal operations and the questions regarding independence of different measures or concepts of formal operations. Finally the Adolescent Egocentrism-Sociocentrism Scale utilized in this research assumes that the imaginary audience, personal fable, and self-focus concepts are part of the same construct but prediction is difficult when scores on the subscales are not found to decrease or increase unilaterally with age. More research in the area of adolescent egocentrism is recommended.
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APPENDIX A

LOGICAL REASONING TEST

by

Gilbert M. Burney

Instructions

1. For most of the questions on this test you will need only to place a cross in the space on the answer sheet like this (X). For a few of the questions, you will be asked to give two or three answers. Instructions for answering these questions will be given when they appear in the test.

2. Several questions refer to diagrams and you should examine these diagrams closely before answering these questions.

3. If you have to change an answer, erase it completely and mark the new choice.

4. Try to answer all questions; if you are not sure of an answer, then choose the one that you think is most apt to be right.

5. Think carefully before you answer each question.

6. Do not make any marks on this test booklet.

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1974
5. A tennis ball is hit from somewhere in the section marked "Right Hand Side" in the diagram below. The ball hits the wall at Y and bounces to C.

![Diagram of tennis court with angles and points labeled X, Y, Z, A, B, C, D, and "Right Hand Side".]  

The size of the angle, from YZ, at which the ball must be hit is:
(a) 25°  (b) 40°  (c) 65°  (d) 60°  (e) 50°

Suppose you have a balance scale similar to the one in the diagram below. Study the diagram carefully. Questions 6-7 refer to it.

![Diagram of balance scale with weights and labels A, B, C, D, E, F, G, H, I, J, K, and pivot.]  

*Weights which can be used:*

- 1 lb.
- 5 pounds
- 10 pounds
- 15 pounds
- 5 pounds
- 10 pounds
- 15 pounds
6. A five pound weight is hung at D. To balance the arm again:
   (a) a one pound weight must be hung at A.
   (b) a ten pound weight must be hung at J.
   (c) a five pound weight must be hung at H.
   (d) a ten pound weight must be hung at E.
   (e) a five pound weight must be hung at K.
   (f) is impossible.

7. A five pound weight is hung at E and a ten pound weight at C. To balance the arm again:
   (a) a five pound weight must be hung at G and a ten pound weight at J.
   (b) a ten pound weight must be hung at H and a one pound weight at K.
   (c) a fifteen pound weight must be hung at I and a one pound weight at H.
   (d) a ten pound weight must be hung at I and a five pound weight at G.
   (e) is impossible.
   (f) a five pound weight must be hung at I and a ten pound weight at G.

Questions 8-10 are called syllogisms. Each syllogism consists of two premises and a conclusion. You are to determine whether each argument is valid or not.

Example:

\[ \begin{align*} 
P_1 : & \text{ No one year old babies can walk.} \\
P_2 : & \text{ Paul is a one year old baby.} 
\end{align*} \]

\[ C : \text{ Paul cannot walk.} \]

This is a valid argument.

\[ \text{ } \]

8. \[ \begin{align*} 
P_1 : & \text{ Not all R's are T's.} \\
P_2 : & \text{ All T's are M's.} 
\end{align*} \]

\[ C : \text{ Some R's may not be M's.} \]

(a) Valid  (b) Invalid
9. \( P_1 \): All coal is white.
\( P_2 \): All white coal produces red smoke when burning.

\[ C: \text{Therefore when coal burns, the smoke is grey.} \]

(a) Valid  (b) Invalid

10. \( P_1 \): When John gets angry at Mary he hits her.
\( P_2 \): John is not angry at Mary.

\[ C: \text{Therefore John will not hit Mary.} \]

(a) Valid  (b) Invalid

The diagram below represents two open-top containers with water in them. There is a length of hose connecting them that will allow water to pass from one container to the other. Container B has a larger diameter than container A. Use the diagram to answer questions 11 and 12.
11. The container A and the container B are moved down the same distance. The water levels in the containers will:

(a) stay at the original height above the table.
(b) change so that the level in A is above the original height above the table and the level in B is below.
(c) change so that the level in B is above the original height above the table and the level in A is below.
(d) change so that the levels in A and B are the same distance above the original height above the table.
(e) change so that the levels in A and B are the same distance below the original height above the table.

12. Container A and container B are moved up the same distance. The water levels in the containers will:

(a) stay at the original height above the table.
(b) change so that the levels in A and B are the same distance below the original height above the table.
(c) change so that the level in A is above the original height above the table and the level in B is below.
(d) change so that the levels in A and B are the same distance above the original height above the table.
(e) change so that the level in B is above the original height above the table and the level in A is below.
The apparatus pictured below can be used to throw shadows onto a screen. The rings pictured can be placed at points D, E, or F or anywhere along a line through D, E, and F between the light and the screen. The shadows that are referred to in the questions are the circular shadows of the rings only, not the ring stands. The distances of D, E, and F from the screen are indicated above and the distances of D, E, and F from the light are indicated below the apparatus. Study the diagram carefully and use it to answer questions 13-14.
13. The ring A is placed at D and its shadow allowed to fall onto the screen and the size of the shadow is measured. Ring A is removed and ring B is placed at D and the size of its shadow on the screen is measured. The two shadows formed:
(a) will be of equal size.
(b) will be of unequal size, the shadow of A being larger than the shadow of B.
(c) will be of unequal size, the shadow of B being larger than the shadow of A.
(d) will be of unequal size, the shadow of A being smaller than the shadow of B.

14. The ring B is placed at D and its shadow allowed to fall onto the screen and the size of the shadow is measured. Ring B is removed and ring C is placed at D and the size of its shadow on the screen is measured. The two shadows formed:
(a) will be of equal size.
(b) will be of unequal size, the shadow of B being larger than the shadow of C.
(c) will be of unequal size, the shadow of C being larger than the shadow of B.
(d) will be of unequal size, the shadow of B being smaller than the shadow of C.
The diagram below represents two glasses, a small one and a large one and two jars, a small one and a large one. Use this diagram for problem 15.

15. If it takes six large glasses of water or nine small glasses of water to fill the small jar and it takes eight large glasses of water to fill the large jar, then how many small glasses of water does it take to fill the large jar?
(a) 10  (b) 15  (c) 11  (d) 16  (e) 12

Questions 16-21 are verbal analogies. Verbal analogies consist of two pairs of words with each pair having the same relationship. In is to out as up is to down is an example of an analogy. The common relationship between in - out and up - down is that they are opposites. Order of the pair of words is also important. Peel is to banana as paint is to house is correct while peel is to banana as house is to paint is incorrect. In the following questions you are to choose two or three words that will best complete each analogy.
Example:

(a) tire (e) anchor
(b) motor is to car as (f) deck is to ship
(c) highway (g) captain
(d) map (h) ocean

In this example, the best choices to complete the analogy are highway and ocean resulting in the analogy: Highway is to car as ocean is to ship. In this case "operates on" is the common relationship, a car operates on a highway and a ship operates on the ocean. On the answer sheet the above question would be answered as shown below.

\[ \begin{array}{cccccccc}
    a & b & c & d & e & f & g & h \\
    ( & ( & (X) & ( & ( & ( & ( & (X) \\
\end{array} \]

Be careful to mark all required answers for each question on the answer sheet.

Some questions require two answers and some require three.

- 16 -

(a) attempt (e) problem
(b) completion as (f) chemical is to solution
(c) work (g) man
(d) question (h) answer

- 17 -

(a) switch (e) engine (i) boat
(b) wire (f) canoe is to (j) engine
(c) socket (g) motor (k) tractor
(d) electricity (h) steam (l) paddle

- 18 -

(a) walk (e) roll
(b) toe is to body as wheel is to (f) machine
(c) knee (g) bicycle
(d) foot (h) spokes
| (a) cow | (e) soldier | (i) bee |
| (b) horse | (f) swarm | (j) pig |
| (c) sheep | (g) pack | (k) regiment |
| (d) foot | (h) litter | (l) wolf |

| (a) brain | (e) spring | (i) bedpost |
| (b) eye | (f) blanket | (j) ticking |
| (c) hat | (g) caster | (k) bed |
| (d) ear | (h) pillow | (l) summer |

| (a) music | (e) chair |
| (b) house | (f) leg |
| (c) bench | (g) eat |
| (d) tuner | (h) furniture |
LOGICAL REASONING ANSWER SHEET

1. a b c d e
   ( ) ( ) ( ) (X) ( )
   Name ____________________

   a b c d e
   ( ) ( ) ( ) (X) ( )
   Date of Birth

   2. a b c d e
      ( ) ( ) ( ) (X) ( )
      ______mo. ______day ______yr.

   a b c d e
   ( ) ( ) ( ) (X) ( )
   Year in School___________

   4. a b c d e
      ( ) ( ) ( ) (X) ( )

   5. a b c d e
      ( ) ( ) ( ) (X) ( )

   6. a b c d e f
      ( ) ( ) (X) ( ) ( ) ( )

   7. a b c d e f
      ( ) ( ) (X) ( ) ( ) ( )

   8. a b (X) ( )

   9. a b (X)

   10. a b (X)

   11. a b c d e
       ( ) ( ) ( ) ( ) (X)

   12. a b c d e
       ( ) ( ) ( ) (X) ( )

   13. a b c d
       ( ) (X) ( ) ( )

   14. a b c d
       ( ) (X) ( ) ( )

   15. a b c d e
       ( ) ( ) ( ) ( ) (X)

   16. a b c d e f g h
       ( ) (X) ( ) ( ) ( ) ( ) ( ) ( )

   17. a b c d e f g h
       ( ) ( ) ( ) (X) ( ) (X) ( ) ( ) (X) ( ) (X)

   i j k l

   18. a b c d e f g h
       ( ) ( ) ( ) (X) ( ) (X) ( ) ( ) (X) ( )

   19. a b c d e f g h
       ( ) ( ) (X) ( ) (X) ( ) ( ) ( ) (X) ( ) (X)

   i j k l

   20. a b c d e f g h
       ( ) ( ) (X) ( ) (X) ( ) ( ) ( ) (X) ( )

   i j k l

   21. a b c d e f g h
       ( ) ( ) (X) ( ) (X) ( ) ( ) ( ) ( ) ( ) ( )

   In order to be counted correct, questions 16-21 must be marked exactly as they are marked on the key.
Appendix A

Enright's Egocentrism Scale

S = Self
I.A. = Imaginary Aud.
P.F. = Personal Fable

These questions concern your opinions about a variety of everyday experiences. Please read each statement and rate it according to how important it is for you personally. Circle the number beside the answer you select.

1. Becoming real good at being able to think through my own thoughts.
   1. NO IMPORTANCE
   2. LITTLE IMPORTANCE
   3. SOME IMPORTANCE
   4. MUCH IMPORTANCE
   5. GREAT IMPORTANCE

2. When walking in late to a group meeting, trying not to distract everyone's attention.
   1. NO IMPORTANCE
   2. LITTLE IMPORTANCE
   3. SOME IMPORTANCE
   4. MUCH IMPORTANCE
   5. GREAT IMPORTANCE

3. Accepting the fact that others don't know what it's like being me.
   1. NO IMPORTANCE
   2. LITTLE IMPORTANCE
   3. SOME IMPORTANCE
   4. MUCH IMPORTANCE
   5. GREAT IMPORTANCE

4. Getting other people to better understand why I do things the way I do
   1. NO IMPORTANCE
   2. LITTLE IMPORTANCE
   3. SOME IMPORTANCE
   4. MUCH IMPORTANCE
   5. GREAT IMPORTANCE

5. Thinking about my own feelings.
   1. NO IMPORTANCE
   2. LITTLE IMPORTANCE
   3. SOME IMPORTANCE
   4. MUCH IMPORTANCE
   5. GREAT IMPORTANCE
6. Trying to figure out how other people will react to my accomplishments and failures.
   1. NO IMPORTANCE
   2. LITTLE IMPORTANCE
   I.A.
   3. SOME IMPORTANCE
   4. MUCH IMPORTANCE
   5. GREAT IMPORTANCE

7. Being able to daydream about great successes and thinking of other people's reactions.
   1. NO IMPORTANCE
   2. LITTLE IMPORTANCE
   I.A.
   3. SOME IMPORTANCE
   4. MUCH IMPORTANCE
   5. GREAT IMPORTANCE

8. Becoming real good at knowing what others are thinking of me.
   1. NO IMPORTANCE
   2. LITTLE IMPORTANCE
   I.A.
   3. SOME IMPORTANCE
   4. MUCH IMPORTANCE
   5. GREAT IMPORTANCE

9. Explaining my unique feelings and viewpoints to others so they can get some idea about what I am like.
   1. NO IMPORTANCE
   2. LITTLE IMPORTANCE
   P.F.
   3. SOME IMPORTANCE
   4. MUCH IMPORTANCE
   5. GREAT IMPORTANCE

10. Knowing my own thoughts and feelings.
    1. NO IMPORTANCE
    2. LITTLE IMPORTANCE
    S.
    3. SOME IMPORTANCE
    4. MUCH IMPORTANCE
    5. GREAT IMPORTANCE
11. Being able to think about having a lot of money someday and how people will admire that.
   1. NO IMPORTANCE
   2. LITTLE IMPORTANCE
   I.A.
   3. SOME IMPORTANCE
   4. MUCH IMPORTANCE
   5. GREAT IMPORTANCE

12. Trying to get other people to know what it is like being me.
   1. NO IMPORTANCE
   2. LITTLE IMPORTANCE
   P.F.
   3. SOME IMPORTANCE
   4. MUCH IMPORTANCE
   5. GREAT IMPORTANCE

13. Thinking about myself.
   1. NO IMPORTANCE
   2. LITTLE IMPORTANCE
   S.
   3. SOME IMPORTANCE
   4. MUCH IMPORTANCE
   5. GREAT IMPORTANCE

14. Trying and being able to figure out if two people are talking about me when they are looking my way.
   1. NO IMPORTANCE
   2. LITTLE IMPORTANCE
   I.A.
   3. SOME IMPORTANCE
   4. MUCH IMPORTANCE
   5. GREAT IMPORTANCE

15. Coming to accept that no one will ever really understand me.
   1. NO IMPORTANCE
   2. LITTLE IMPORTANCE
   P.F.
   3. SOME IMPORTANCE
   4. MUCH IMPORTANCE
   5. GREAT IMPORTANCE
APPENDIX C

(Vocational Plans - Opening) EGO IDENTITY INTERVIEW

What school program are you enrolled in here at Bordentown? (if high school)

Do you have any ideas about what you'd like to do after graduation from high school?

(If college or other education, proceed to that block of questions.)
(If work, proceed to that block of questions.)
(If marriage, proceed to that block of questions.)
(If "Don't Know" ask the following)

Do you think it is more likely that you will continue with your education after high school or that you will seek employment?

(Proceed to the appropriate block of questions. If the answer is again "Don't Know" proceed to the closing block of questions on vocational plans.)
(Vocational Plans - Further Education)

(If appropriate) Do you have any plans for a college major at this time?

What type of work would you like to do?

How did you come to decide on ________________? (Ask concerning future plans, if known, otherwise concerning major field. If no definite interests mentioned then omit this question and ask:

What do you hope to gain from attending college? Then skip to the closing block of questions on vocational plans.)

When did you first become interested in ________________?

What do you find attractive about ________________? (If several fields mentioned spontaneously, ask about each in turn.)

Have you ever considered any other fields beside ________________?

(List all of the fields that were previously mentioned.)

(If yes, repeat questions concerning when interested and nature of attraction.)

How seriously were (are) you considering each of the fields you mentioned?

(For students who have specified a decision)
Did you ever feel that you were actively deciding between ___________ and ___________?

Was this a difficult decision to make?
What influenced your choice here?

(For students who have not specified a decision)

Do you feel that choosing a career is something that you're trying to work out now, or do you feel that this is something where you can let time take its course and just see what happens?

Do you have any idea as to when you'd like to have this decision made?

How are you going about getting the information you'd like to have in order to make a decision?

Do you feel that this is an important decision for you to make now or are you more concerned with other things right now?

(Proceed to the closing block of questions on vocational plans.)
(Vocational Plans - Employment)

What type of employment would you like to find?

How did you come to decide on ____________?  
When did you first become interested in that type of work?  
What do you find attractive about ____________?  
(If several alternative possibilities spontaneously mentioned,  
ask about each in turn.)

Have you ever considered any other type of work beside ____________?  
(List all of the fields previously mentioned.)

(If yes, repeat questions concerning when interested and nature  
of attraction.)

How seriously were (are) you considering each of the plans you  
mentioned?

(For students who have specified a decision)  
Do you feel that you were ever actively deciding between ____________  
and ____________?  
Was this a difficult decision for you to make?  
What influenced your choice here?

(For students who have not specified a decision)  
Do you feel that choosing a career is something that you're trying to  
work out now, or do you feel that this is something where you can  
let time take its course and just see what happens?  
Do you have any idea as to when you'd like to have this decision made?  
How are you going about getting the information you'd like to have  
in order to make a decision?  
Do you feel that this is an important decision for you to make now  
or are you more concerned with other things right now?

Have you ever seriously considered continuing your education after  
high school?  
(If yes) Could you describe your thinking at that time?  
(If appropriate) Why did you decide not to go on with school?

(Proceed to the closing block of questions on vocational plans.)
(Vocational plans - Marriage)

How did you come to decide on marriage as the best plan for you? Do you plan to have children? If yes, do you plan to work or remain at home until you have children? (If appropriate) If and when you have children, would you continue to work?

When did you first become interested in these plans? What do you find attractive about marriage (and work)?

Have you ever considered any other type of plan?

(If yes, repeat questions concerning when interested and nature of attraction).

How seriously were you considering each of the plans you mentioned?

Have you ever seriously considered continuing your education after high school? (If yes) Could you describe your thinking at that time? Why did you decide not to go on with school?
Most parents have plans for their sons (daughters), things they'd like to see them go into, things they'd like to see them do. Did your folks have any plans like that for you?

Do you think they may have had a preference for one plan over another, even though they would never have tried to pressure you about it?
(If yes) Did you ever consider ________________________?

How willing would you be to change your plans from ____________ (the strongest one or two plans mentioned) if something better came along?
(If asked: "What do you mean by better?" respond: Whatever might be better in your terms.)

(If R indicates the possibility of change)
What might you change to?
What might cause you to make such a change?
How likely do you think it is that you will make such a change?
Do you have any religious preference?
Do your parents have any religious preference? If so, in what religion were each of your parents raised?
Have they both continued in the _______ religion?
(Separate by M and F if different religions)

How important is religion in your home?
(If important) Can you give me some examples?

Are you currently active in church or church groups? (Adapt for Jews)
(If not active) How about in the past, were you ever active in church groups?
(If not already answered) How frequently do you usually attend church services?
What is your reason for attending services?
How important would you say religion is in your life?

You have already answered this next question in part, but I want to ask it directly. I'd like to find out where you stand on questions of the existence of God and the importance of organized religion. (If Catholic, add: and the authority of the Pope).

How do your parents feel about your religious beliefs?

Are there any important differences between your beliefs and those of your parents?

Was there ever a time when you came to question, to doubt, or perhaps to change your religious beliefs?
What types of things did you question or change?
What started your thinking about these questions?
How serious were these questions for you?
Do you feel that you've resolved these questions for yourself or are you still working on them?

(If resolved) What helped you to answer these questions?

(If unresolved) How are you going about trying to answer these questions?

At this point, how well worked out do you think your ideas in the area of religion are?
Do you think your ideas in this area are likely to remain stable or do you believe that they may very well change in the future?

(If they may change) In what direction do you think your beliefs might change?
What might bring about such a change?
How likely is it that such a change might occur?

(If evidence of continued thought to religious questions)
How important is it to you to work out your ideas in the area of religion?
Are you actively trying to work out your beliefs now or are you more concerned with other things right now?

How would you like to see your own children raised with respect to religion? Why?
(Politics)

Do you have any political preferences? (If asked "What do you mean by political preference?" respond: Either party preference or a position on the liberal-conservative dimension.)

Do you consider yourself a Democrat or a Republican?
Do you consider yourself as general liberal, moderate, or conservative?

Does your father have any political preferences? (D or R; L, M, or C?)
Does your mother have any political preferences? (D or R; L, M, or C?)

How important is politics in your home?
(If important) Can you give me some examples?

Are there any political or social issues that you feel pretty strongly about?
(If asked "Such as?" respond: Whatever might be important issues for you? If asked again suggest such issues as the economy, the energy problem, etc.)

What would you like to see done about ________?

Are there other issues which you have views about?

What would you like to see done (in each of the areas mentioned)?

How did you come to develop the beliefs that you are expressing?
What do you feel have been the most important influences on you concerning these questions?

Have you ever taken any political action, like joining groups, participating in demonstrations, participating in election campaigns, writing letters to government or other political leaders?

What led you to become involved in these activities? (When possible mention the various activities).

(If no issues or activities were discussed)

Do you feel that you are actively trying to arrive at a set of political beliefs or do you feel that the area of politics isn't very important to you at the present time?
(If now actively trying) Can you tell me something about the types of things you are thinking about?
How are you going about getting the information you need to make a decision? How important is it for you to work out these ideas?
How do your parents feel about your political beliefs?

Are there any important differences between your views and those of your parents?

Was there ever a time when you found your political ideas undergoing change—where you believed one thing and then, several months or years later, found you had very different ideas on the same issue? What led you to make that type of change?

At this point do you believe that your political beliefs are likely to be stable over time or do you feel that they may very well change?

(If they may change) In what direction do you think your beliefs might change? What might bring about such a change? How likely is that such a change might occur?

(If possible change due to changes in the world situation.) Do you feel that the changes would occur just on specific issues, or might there be a change in your general political philosophy? How likely is it that such a general change might occur?

How would you like to see your own children raised with respect to politics? Why?
(Sex-Role)

Changing the topic again, I'd like to find out something about how you see the (masculine) (feminine) sex-role.

There are a variety of behaviors and traits that different people associate with being __________; what characteristics do you usually associate with __________?

How well does this picture describe you, personally?

What advantages or disadvantages do you see as associated with the __________ role in society?

How did you come to learn what it means to be __________?
Do you feel this is something that came rather naturally for you or were there times when you were uncertain as to how you should act? Can you give me some examples?

How was your behavior in this area influenced by your parents?
How about the effects your brothers or sisters may have had?
Are there any important differences between the ways in which you and your (father) (mother) express (masculinity) (femininity)?
How about differences between you and your (brothers) (sisters) regarding (masculinity) (femininity)?

Are there any areas of your behavior which you are still questioning as a (male) (female)?
(If yes) What is the nature of your uncertainty?
Why do you think this is an issue for you?
How are you going about trying to work out your ideas about what you should do?

Do you see your ideas about (masculinity) (femininity) remaining stable or do you see them as changing in the future?

How would you like to see a (son) (daughter) of your own raised with respect to (masculinity) (femininity))?
Why?

Conclusion

That's all the questions I have; is there anything you would like to ask me?
VOCATIONAL CHOICE
Past crisis ______ In crisis ______ No crisis ______
Committed ______ Not committed ______
Secondary elements (if any) ________

RELIGIOUS BELIEFS
Past crisis ______ In crisis ______ No crisis ______
Committed ______ Not committed ______
Secondary elements (if any) ________

POLITICAL IDEOLOGY
Past crisis ______ In crisis ______ No crisis ______
Committed ______ Not committed ______
Secondary elements (if any) ________

SEX ROLE ATTITUDES
Past crisis ______ In crisis ______ No crisis ______
Committed ______ Not committed ______
Secondary elements (if any) ________

OVERALL STATUS
Appendix D
Operational Definitions of Ego Identity

Working from Erikson's theoretical writings, James Marcia has developed a four-category classification system for the study of identity. The four identity statuses are: (a) identity achievement, (b) moratorium, (c) foreclosure, and (d) identity diffusion. These statuses are defined in terms of the process of identity formation by description on two dimensions: "crisis" and "commitment".

Crisis refers to a period of struggle or active questioning in arriving at identity decisions regarding goals, values, or beliefs. There are three positions on the crisis dimension: (a) past crisis, (b) in crisis, and (c) absence of crisis. To say that a person is past crisis means that there was a period of time when active consideration was given to a variety of potential identity elements but that period is now over. The person may have successfully resolved the crisis and emerged with a firm sense of direction for the future. Alternatively, the task may have been abandoned without reaching any meaningful conclusion. To be in crisis implies that one is currently trying to work through identity questions and is striving to make important life decisions. The absence of a crisis means that the individual has never found it necessary to choose between competing identity alternatives concerning personal goals, values, or beliefs.

Commitment involves the making of a relatively firm choice regarding identity elements and engaging in significant activity directed toward the implementation of that choice. Commitments are described
as either present or absent. To say that commitments are present means that the individual's identity elements are serving as meaningful guides to action and that thought is not being given to making any major changes in those elements. The absence of commitment implies that the person's ideas are weakly held and that behavior is changeable. There is no strongly felt sense of direction. There may or may not be a concern with forming personal commitments at the present time.

An "identity achiever" is someone who has gone through a period of crisis and has developed relatively firm commitments. The term "moratorium" is used to refer to a person who is currently in a state of crisis and is actively exploring alternatives in an attempt to arrive at a choice. A person is classified as a "foreclosure" if there is no history of an exploration or crisis of alternatives but there are, nevertheless, commitments regarding goals, values, and beliefs. The commitments which have been made are generally ones which reflect the wishes of the parents or other authority figures. The category of "identity diffusion" includes individuals who are not committed to anything and who are not actively trying to make a commitment. They may never have been in crisis, or they may have had a period of questioning but were not able to resolve it and subsequently emerged without making a decision. (See Ego Identity Scoring Sheet attached to Ego Identity Interview).

When scoring an interview segment for the crisis dimension the following should be considered:
(a) **Knowledgeability.** The respondent should exhibit an awareness of the content and implication of any alternative that has been or is being seriously considered. It should be evident that the person's knowledge extends beyond a casual and superficial familiarity. Absolute accuracy of information is not required. Personal interpretation of the material is added evidence that the alternative has been seriously considered.

(b) **Activity directed toward the gathering of information.** An individual in an identity crisis should be engaged in activity for the purpose of learning more about the alternatives under consideration. This may include reading, taking courses or having discussions with parents, peers, or others who are knowledgeable about the material of interest. Actual experimentation with a potential identity element may occur but this is not an essential feature of a crisis.

(c) **Subjective discomfort.** The idea that one's goals, values, or beliefs are indefinite often results in feelings of frustration, intolerance of ambiguity, and/or anxiety. The intensity of these emotions vary widely from individual to individual. In some instances an identity crisis may occur entirely on an intellectual level.

(d) **Desire to make an early decision.** Because of the subjective discomfort associated with crisis, an individual will usually have a desire to resolve the indecision at as early a date as is realistically possible. The ability to live indefinitely with ambiguity suggests that identity alternatives are not really under active, serious consideration.
(e) **Evidence of consideration of alternative potential identity elements.** Such evidence is most easily observable when the respondent has reached a crossroads and sees two or more distinguishable alternatives that could be adopted. Often there is a wavering back and forth between the possibilities. However, not all identity crises take this form. Evidence of consideration of alternative potential identity elements can be inferred from a sequential pattern of changes over time. This sequential experimentation with distinctly different possibilities should generally be considered as a past crisis. However, a difficulty which exists in interpreting this latter pattern is in determining whether the identity search has genuinely been completed (at least for the foreseeable future). The recency of the decision and the strength of the current commitment may be used as guides here.

When scoring an interview segment for the commitment dimension, the following should be considered:

(a) **Knowledgeability.** Same as above.

(b) **Activity directed toward the implementation of the chosen identity elements.** Identity commitments should be distinguished from the mere verbalization of socially appropriate ideas. A true commitment should influence an individual's day-to-day living activities. Such activities may involve the preparation for future life roles consistent with one's goals, values, or beliefs or may represent their current implementation.

(c) **Projection into the future.** Identity commitments provide a mechanism for integrating the past with the present and the present
with the future. This does not mean that there is an expectation that the content of identity elements will remain unchanged. Rather, a sense of continuity should be evident between where one is now and where one wishes to be in the future.

(d) **Resistance to being swayed.** The presence of meaningful commitments should be reflected in a sense of stability and confidence in one's chosen goals, values and beliefs. The respondent should be relatively resistant to deliberate or inadvertant attempts by the interviewer to induce contradictory statements.
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The present study investigated the relationships between ego identity, egocentrism, and formal operations in an adolescent setting. Also included in the study were various subscales of the different measurements, as well as grade in school and sex. It was hypothesized that a regression model could predict ego identity status from formal operations measured by the Piagetian Formal Operations Instrument (Burney, 1974) and egocentrism measured by the Adolescent Egocentrism-Sociocentrism Scale (Enright, Shukla, and Lapsley, 1980). Ego identity status was determined by use of the Ego Identity Interview developed especially for adolescents by Archer (1980).

The subjects were 15 males and 15 females each in grades eight, ten, twelve, and a college sophomore class. Subjects ranged in age from 13 to 24.

The correlational results indicated significant and positive relationships between ego identity, formal operations, and grade. Egocentrism and sex were not found to be significantly related to ego identity per se, but egocentrism was found to be significantly negatively to vocational identity.
Regression analysis revealed that grade was the most valuable predictor of ego identity, significantly explaining approximately 21 percent of the variance. Also the self-focus subscale of egocentrism, when added to grade, significantly explained 21 percent of the variance in vocational identity. Further investigation regarding the concept of egocentrism among adolescents and self-focus as it relates to vocational identity was recommended.