Adolescent Egocentrism and Its Relationship to Parenting Styles and the Development of Formal Operational Thought

Theo A. Riley
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ADOLESCENT EGOCENTRISM AND ITS RELATIONSHIP TO PARENTING STYLES AND THE DEVELOPMENT OF FORMAL OPERATIONAL THOUGHT

by

Theo A. Riley

A dissertation submitted in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

in

Psychology

UTAH STATE UNIVERSITY
Logan, Utah

1984
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Theo Riley
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ABSTRACT

Adolescent Egocentrism and Its Relationship to Parenting Styles and the Development of Formal Operational Thought

by

Theo A. Riley, Doctor of Philosophy

Utah State University, 1984

Major Professors: Dr. Elwin Nielsen
Dr. Gerald Adams

Department: Psychology

A predicted association between family relations and cognitive development and the emergence of adolescent egocentrism was explored in this study. A sample of seventh grade boys \( n=131 \) and girls \( n=120 \) completed Elkind and Bowen's Imaginary Audience Scale (a measure of egocentrism) and selected items from Heilbrun's Parent-Child Interaction Rating Scale and Schaefer's Parent-Behavior Inventory. A modified version of Lawson's Classroom Test of Formal Operations was used to measure cognitive development. Contrary to a theoretical based hypothesis a negative rather than positive relationship was found between level of formal operational thought egocentrism. For parenting style, perceived rejection/control and emotional support was associated with diminished egocentrism. Mixed results were found for perceived physical effect and egocentrism. Perceived parental withdrawal heightened egocentrism for both sexes. The data provide an alternative model to past cognitive development theory for the development of egocentrism. Parental socialization factors were found to contribute as much variance to the level of egocentrism as did level of formal operational thought. (148 pages)
CHAPTER I

STATEMENT OF THE PROBLEM

Adolescence has been characterized as a time of general upheaval in development when conflicts of dependence and independence reemerge. It is a period when parent and child have difficulty understanding one another. Parents and other significant adults often complain that adolescents seem overly sensitive and self-conscious. David Elkind (1967) has offered one theoretical perspective accounting for adolescent self-consciousness.

More specifically, Elkind has suggested that adolescents experience shyness and withdrawal because of a temporary egocentrism which he describes as beliefs in the imaginary audience and personal fable. An imaginary audience is the belief that others are monitoring behavior while noticing both strengths and weaknesses of the adolescent. Elkind and Bowen (1979) have defined two aspects of the imaginary audience. These are the abiding self, aspects of the permanent self which the adolescent is reluctant to reveal, and the transient self, momentarily embarrassing characteristics that the adolescent thinks of hiding. A separate aspect of egocentrism proposed by Elkind is the personal fable. Not only do they believe that others are watching, but that no one can understand their feelings. As such the youth perceives his or her life as unique.

Varying perspectives account for the development of egocentrism during adolescence. One is a cognitive developmental model proposed by David Elkind (1967) attributing egocentrism to the emergence of formal
operational thought. A second model suggests that egocentrism is the result of social factors in the adolescent's environment (Adams & Jones, 1982; Enright, Shukla & Lapsley, 1980).

According to the cognitive model, Elkind (1967) proposed that egocentrism is the direct result of the fourth developmental level proposed by Piaget, formal operational thought. Formal operational thought is characterized by the ability to think hypothetically, e.g. think about thoughts. As with other levels of cognitive development, formal operational thought is accompanied by a stage-specific form of egocentrism. "The essential meaning of egocentrism is an embeddedness in one's own point of view, or an inability to 'decenter' to other perspectives" (Looft & Charles, 1972, p. 21). Adolescent egocentrism is characterized by treating hypothetical thinking like the imaginary audience and personal fable as if they were the actual thoughts of others. These opinions of the adolescent are treated as fact, initially, but through a process of experimentation and logical analyses the adolescent decides which information is true (Flavell, 1963).

The social model suggests that egocentrism is influenced by factors other than formal operational thought like the adolescent's environment, gender, socialization, and perceived parenting style. First, Simmons, Rosenberg and Rosenberg (1973) found same age adolescents who were in a seventh grade junior high setting more self-conscious than those attending sixth grade in elementary school. They attributed the difference in self-consciousness to the differences in school environment. Second, Simmons and Rosenberg (1975) found more self-consciousness among white females than black females and white males. They speculated that this was due to differences among white
females in attitudes toward sex role, peer relationships and feelings about changing looks in adolescence. Enright, Shukla and Lapsley (1980) also found females revealed high egocentrism on the Adolescent Egocentrism-Sociocentrism measure. Although they did not investigate a cognitive model of egocentrism, they felt their results were not adequately explained by the development of abstract reasoning. Finally, Adams and Jones (1982) found that perceived paternal and maternal parenting styles were correlated with imaginary audience behavior in a sample of adolescent males and females. These investigations offered alternatives to Elkind's (1967) original proposal for the development of adolescent egocentrism.

Purposes and Objectives

The purpose of this research was to explore the cognitive developmental model of adolescent egocentrism proposed by Elkind (1967) and a socialization model emerging from the recent research of several social scientists (Adams & Jones, 1982; Enright, Shukla, & Lapsley, 1980; Simmons & Rosenberg, 1975; Simmons, Rosenberg & Rosenberg, 1973). There were three objectives in conducting this research. The first was to understand the relationship between the acquisition of formal operational thought and the emergence of adolescent egocentrism as evidenced by imaginary audience beliefs. This information would begin to provide an empirical base for the acceptance of Elkind's (1967) hypothesis. The second objective was to understand the relationship between adolescent egocentrism as evidenced by imaginary audience beliefs and the adolescent's perception of parenting styles. This data would provide
additional evidence for a multi-faceted explanation of adolescent egocentrism. The third objective was to understand what each factor, perceived parenting styles and acquisition of formal operational thought, contributed most (or if at all) to adolescent egocentrism. This would provide initial information for an interaction model of cognitive and social contributions to adolescent egocentrism.

**Definition of Terms**

Several terms in this study had been operationalized in differing ways in past research. In the present study the following terms were defined accordingly:

1. **Abiding self** - one component of the imaginary audience scale used to measure permanent aspects of the self which the adolescent was self-conscious about revealing to others (See Appendix A).
2. **Adolescent egocentrism** - an inability to decenter from one's point of view.
3. **Formal operational thought** - the fourth stage of cognitive development hypothesized by Piaget. One aspect was the ability to think hypothetically which enabled the individual to solve problems of scientific logic.
4. **Imaginary audience** - a belief that others had thoughts about one's behavior and were watching appearance and actions.
5. **Parenting style** - perceived behaviors of parents which included rejection-control, emotional support, physical effect and withdrawal.
6. **Personal fable** - a belief that one's development and experiences were unique.

7. **Transient self** - those temporary qualities of self which the adolescent was self-conscious about revealing to others. It was one aspect of imaginary audience behavior (See Appendix A).
CHAPTER II

REVIEW OF THE LITERATURE AND HYPOTHESES

In this review of the literature, the theory of egocentrism is discussed with presentation of empirical evidence in support of the imaginary audience construct. The etiology of adolescent egocentrism as it relates to formal operational thought and perceived parenting styles is presented.

Theories of Egocentrism

In 1967, David Elkind described the forms of egocentrism arising from each stage of Piagetian cognitive development. Egocentrism for each stage is the inability to "decenter" from one's own point of view. Decentering involves several types of skills:

...we can look at cognitive development as involving several cognitive tasks. These tasks include: (1) the differentiation between transient and abiding facets of reality; (2) the differentiation between objective and subjective aspects of reality; (3) the differentiation between the universal and particular facets of reality. At each stage of development, these tasks have different content and structure, but the same types of differentiation must be made (Elkind, 1978, p. 86).

During infancy, because the cognitive task is the conquest of object understanding, the corresponding egocentric state is the differentiation of objects and sense impressions of them, i.e., the object exists only if it is present. During the pre-operational years, the child is developing an understanding of the symbol. At this level, the child has difficulty differentiating between symbols and reality, i.e., dreams are equated with waking states. In the stage of concrete operations which involved mastering classes, relations and quantities, ego-
centrism is characterized by an inability to differentiate between mental constructions and perceptual givens, i.e., mental operations are treated as fact and contradictory information in reality is rationalized into the person's preconceived explanation. The task for formal operational thought is the conquest of thinking or the ability to differentiate other's thoughts from one's own thoughts.

Looft (1972) referred to the centration process, or inability to decenter, as intrinsic to egocentrism at all cognitive stages. Centration is believed to correlate with age, level of intellectual ability and social class. He believed the ability to overcome centration to be affected most strongly by interpersonal interaction. The appearance of dissonant information from others causes a tension within the individual which leads to higher stages of cognitive development as one assimilates new material. He quotes Flavell:

> In the course of his contacts (and especially, his conflicts and arguments) with other children, the child increasingly finds himself forced to reexamine his own percepts and concepts in light of those of others, and by so doing, gradually rids himself of cognitive egocentrism (Looft, 1972, p. 75).

The process of "decentering" in adolescence consists of differentiating the permanency, subjectiveness and objectiveness of thought. Adolescents construct an imaginary audience of interested onlookers because they do not distinguish between their thoughts and those of others. This audience is thought to constantly monitor the adolescent's behaviors. The imaginary audience may serve a motivational function. When a boy takes a body building class, he believes he will appear more acceptable to others. It may also have negative consequences like a self-defeating thought. "No one likes me because they think I have a big nose." Regardless of the consequences, imagi-
nary audience behavior diminishes as adulthood approaches, but usually does not disappear altogether (Elkind, 1978). One explanation for the disappearance of the imaginary audience is that through interpersonal interaction, adolescents eventually differentiate subjective from objective. Eventually through interaction with others, they integrate others' feelings into their own (Looft, 1972).

Another aspect which is characteristic of adolescent egocentrism is the personal fable. It is a failure to differentiate between the universal and the particular. The individual believes that feelings and experiences are unique and that no one understands, e.g., "Parents do not know what it is like to be in love." The personal fable is the complement of the imaginary audience. If everyone is looking at the person, the adolescent must be unique. Like the imaginary audience, the personal fable has both positive and negative consequences. Because of a belief in a unique talent, the individual may strive to excel in that talent. On the other hand, one may engage in reckless behaviors since the consequences happen only to others. The belief in personal fable also diminishes with age through interpersonal interactions where the adolescent finds similarities with others (Elkind, 1978).

In summary, adolescent egocentrism is an inability to decenter one's point of view which is characterized by both the imaginary audience and personal fable. It is hypothesized that because of the development of formal operational thought, the adolescent thinks hypothetically. Through social interaction, the adolescent learns to differentiate individual thoughts from those of others.
Empirical Evidence of the Imaginary Audience

Because the focus of this investigation is to examine imaginary audience behavior rather than the personal fable, the research review will center on the concept of the imaginary audience. Readers interested in the broader notion of adolescent egocentrism are referred to Looft (1972), Elkind (1967, 1975, 1978), Flavell (1963), and Muuss (1982).

Imaginary audience behavior has been measured through the use of the Imaginary Audience Scale (Adams & Jones, 1980; Elkind & Bowen, 1979) and the Adolescent Egocentrism-Sociocentrism measure (Enright, Lapsley & Shukla, 1979, Enright, Shukla & Lapsley, 1980). The former assesses imaginary audience behavior by focusing on the abiding and transient aspects of egocentrism. The latter scale assesses three aspects of adolescent egocentrism, one of which is imaginary audience behavior. Research using both scales supports the existence of the imaginary audience concept.

In designing the Imaginary Audience Scale, Elkind and Bowen (1979) divided it into two components of the self, the abiding and transient selves. In a cross-sectional study utilizing an urban sample of 700 boys and girls ranging in age from nine to seventeen years, the Imaginary Audience Scale was given twice to all subjects to establish an estimation of reliability. The subjects were also given additional measures of self-esteem and locus of control to provide validity data. Two major findings were that adolescents demonstrated relatively independent transient and abiding concepts of self. Furthermore, eighth graders were more self-conscious than were younger or older subjects, about revealing themselves to others. Abiding self items were moderately and
negatively related to self-esteem. Neither imaginary audience subscale was related to locus of control. Thus, Elkind and Bowen (1979) concluded that the Imaginary Audience Scale had reasonable reliability and validity for further research.

Two studies utilizing the Adolescent Egocentrism-Sociocentrism measure added credibility to the concept of the imaginary audience. The Adolescent Egocentrism-Sociocentrism measure has directions (Enright, Lapsley, & Shukla, 1979) requesting the student to indicate whether a statement ranges from little importance to great importance on a five point Likert scale. A sample imaginary audience item is "when walking in late to a meeting or lecture, trying not to distract everyone's attention" (Enright, Lapsley & Shukla, 1979, p. 689).

Enright, Lapsley and Shukla (1979) had twenty adolescents from sixth grade, eighth grade and college complete the Adolescent Egocentrism-Sociocentrism measure. They expected that as individuals move into late adolescence, imaginary audience behavior would decline. Results indicated that early adolescence is characterized by high imaginary audience beliefs while later adolescence is higher in other aspects of egocentrism, e.g., self-introspection to solve conflicts.

A subsequent study by Enright, Shukla and Lapsley (1980) was undertaken to replicate the results of the first study and to add construct validity by comparing egocentrism with Fenigstein, Scheier, and Buss (1975) measure of self-consciousness. Self-consciousness was differentiated from egocentrism by theoretical source. Egocentrism was thought to result from cognitive development while self consciousness emerged due to comparison with others (public self consciousness) and introspection (private self consciousness). Once again it was hypothesized that
there would be a decline in the imaginary audience behavior from early to late adolescence. A total of 220 adolescents participated in the study. Five grades were represented: sixth, eighth, tenth, twelfth and college. Investigators found stronger evidence for the existence of the imaginary audience than the personal fable. Imaginary audience beliefs once again declined in late adolescence. Imaginary audience behavior showed a moderate relationship with private and public self consciousness.

Adams and Jones (1980) provide the most recent data utilizing the Imaginary Audience Scale. While Elkind and Bowen (1979) utilized an urban sample, Adams and Jones (1980) validated the Imaginary Audience Scale using a rural sample. The Imaginary Audience Scale was administered to 115 junior and senior high school students. Subjects were asked to respond to an empathy scale, a social sensitivity test, a measure of social desirability and the IAS. Imaginary audience behavior showed little correlation with social sensitivity and empathy. Results from this study differed in two significant ways from the Elkind and Bowen (1979) study. First, evidence did not support two distinct scales for abiding and transient selves. Second, imaginary audience behavior increased as age increased so that the oldest subjects reported the most imaginary audience behavior. These results were discrepant with Enright, Shukla and Lapsley's (1980) data. Adams and Jones indicated that rural youth may follow different developmental pathways and that a number of social and cognitive influences on imaginary audience behavior have yet to be understood.

Empirical data exist for imaginary audience behavior, one aspect of egocentrism, as measured on both the Adolescent Egocentrism-
Sociocentrism measure (Enright, Lapsley & Shukla, 1979) and the Imaginary Audience Scale (Elkind & Bowen, 1979). It appears that imaginary audience behavior may be modestly correlated with self-esteem, but has little relationship to locus of control. Mixed results have been found regarding developmental patterns in egocentrism behavior. In an urban sample, imaginary audience behavior declined until late adolescence while with a rural sample, imaginary audience behavior increased with age.

**Formal Operational Thought**

The development of formal operational thought is believed to contribute to adolescent egocentrism (Elkind, 1967; Enright, Lapsley & Shukla, 1979). To understand this relationship, it is first necessary to review the stages of cognitive development, the characteristics of formal operational thought and its limitations.

The adolescent in comparison to younger children can accomplish tasks more efficiently and quickly as well as utilizing a new mental process in problem solving. Change in adolescent thinking is both quantitative and qualitative. Researchers attempting to understand cognitive development have focused on both. One major thrust has been the study of intelligence as introduced by Binet in his development of an intellectual test for the French government which would help distinguish the dull from the bright citizen. A second thrust has been that of Jean Piaget who emphasized the qualitative changes in mental development, the maturational changes underlying the fundamental processes for improvement in intellectual performance. He assumed that cognitive development was a series of stages and that the individual
achieved these in a sequential fashion at individual rates (Dragastin & Elder, 1975).

Piaget named four stages of cognitive development. During the earliest sensorimotor stage (birth to 18 months) the infant is developing mental processes through responses to objects and people in the environment. Already acquired responses may be generalized to new events, a process called assimilation. Responses may also be modified according to new information or accommodation. These processes continue to enhance mental development throughout the second stage, that of preoperational thought (18 months to 7 years). During this period the child learns to utilize language, enabling the manipulation of meanings as well as objects. However, conceptual ability is still limited. The third stage, concrete operations (7 to 11 years) accounts for many important advances in cognitive development. It is during this time that the youth begins to extend thinking from the actual to the potential, although the basic thought processes remain attached to reality. Some of the operations the concrete operational individual is able to perform are relativity (one object compared to another), class inclusion (one object as part of a class of objects), conservation (change in the shape of an object does not change the amount of an object) and serialization (being able to order objects according to a dimension like size). Unlike formal operational thought, concrete thought begins with the real rather than the potential (Conger, 1973).

Piaget's highest level of cognitive development is formal operational thought. The hallmark of this stage is the shift from the influence of reality to possibility:
In formal thought there is a reversal of the direction of thinking between reality and possibility in the subject's method of approach. Possibility no longer appears merely as an extension of an empirical situation or of actions actually performed. Instead, it is reality that is now secondary to possibility (Conger, 1973, p. 153).

The individual is able to utilize hypothetico-deductive methods for problem solving and may have several hypotheses or combinations to test. Formal reasoning is a second-order process which is performed on concrete operations. It is the ability to think about thoughts (Manaster, 1977).

The types of complex operations solved by the use of formal reasoning include: (1) combinatorial thought, (2) verbal problems in which the individual is able to separate verbal information which is important from that which is insignificant and to think of solutions which depart from actual fact, and (3) proportional reasoning involving the ability to combine information such as length and weight in a coordinated fashion to problem solve (Adams & Gullotta, 1983).

Several things are believed to influence the development of formal operational thought. For example, Berzonsky (1978) indicated that development appears to be based on aesthetic and personal experience. Development is gradual. Some areas develop before others and application is not consistent across all contents. Some adolescents have been prematurely structured by having to learn survival skills to care for themselves or siblings. This has left little time for play and development of cognitive skills (Elkind, 1975). Dulit (1972) and Mosher (1979) concluded that some adults may never develop formal operational thought and that this is not a sign of retarded or pathological development. These adults evolve alternative patterns of thinking.
based upon their experience and needs. Development is also considered an interaction between age and intelligence. For example, significant gains in formal operational thought were found by adolescents of average intelligence from 12 to 14 and by low intelligence from 14 to 16 (Conger, 1973, Manaster, 1977). Development varies across cultures. Middle class children appear to perform better than lower socioeconomic groups. In one study, rural villagers in Turkey never reached formal operational thought while adults in urbanized, education-conscious sections of that country evidenced formal operational thought (Conger, 1973). Also some evidence suggests boys continue to score higher on tests of formal operational thought than girls (Dulit, 1972). Perhaps these differences are due to Elkind's (1975) hypothesis that girls are more likely to apply their formal operational thinking to interpersonal matters than to matters of science which are characteristic of most items of a test of formal operational thought.

Berzonsky (1978) and Broughton (1979) have pointed to dangers in regarding formal operational thought as the sole means of thinking for adolescents. Piaget's commitment to logical empiricism, "experience is the only means of knowing the world and that science offers the only guarantee of true knowledge" (Broughton, 1979, p. 50), influenced his conception of cognitive development. Formal operational thought became the norm for adolescent cognitive development. However, Broughton (1979) indicates that logic is too limited a model of cognitive understanding and reasoning and formal operational thought is representative of only one factor in adolescent thinking. Berzonsky (1978) based his criticism of formal operational thought and his extended model on concepts posed by Dulit (1972). If formal opera-
tional thought is to develop, it will be during the period of adoles­
cence. However, specific interests and vocational specialization of
individuals may encourage development of other branches of thinking.
Although the first levels of Piagetian development appear to be almost
universal, later cognitive operations may branch into such areas as
formal operational thought, aesthetic knowledge and personal knowledge.
More specifically, formal operations can branch into behavioral con­
tent, symbolic content, semantic content and figural content (Berzonsky,

The development of formal operational thought is believed to be
the basis for adolescent egocentrism because egocentrism requires the
ability to conceptualize the thoughts of others which is possible only
after the development of upper level cognitive processes (Elkind,
1967).

**Perceived Parenting Style and Egocentrism**

The socialization model explaining egocentrism supports the theory
that perceived parenting style affects the adolescent's imaginary
audience behavior (Adams & Jones, 1982; Anolik, 1981). To better
understand this relationship, the definition of parenting style will be
reviewed, limitations of the perceived parenting style model will be
discussed, and studies showing a relationship between perceived
parenting style and egocentrism will be presented.

The factors of rejection-control, withdrawal, emotional support
and physical affect discussed in this study evolved from several deca­
des of research. Initially, investigators tried to understand the rela­
tionship between parental love and a child's behavior. The term, love,
was called support, nurturance and other descriptors. In trying to understand the concept of parental support, numerous attempts were made to operationalize exactly what a parent did that affected a child. Two critical variables, support and control, were identified by Symonds (1939) as a dominance-submission and an acceptance-rejection continuum of behaviors. Since the work of Symonds, other researchers have supported the concept of a control-support combination and have tried to identify specific behaviors to describe each dimension. The reader interested in a more complete discussion of the research is directed to Lytton (1971), Straus (1964), Rollins and Thomas (1979) and Yarrow (1963). To operationalize parent style, several behavior rating scales have been developed. Three of the more frequently used parenting scales were the Parent-Child Interaction Rating Scale by Heilbrun (1964, 1973), the Cornell Parent Behavior Description by Devereux, Bronfenbrenner and Rodgers (1969) and the Parent Behavior Inventory by Schaefer (1965). A factor analysis to understand what clusters the scales were measuring resulted in the authors (Ellis, Thomas & Rollins, 1976) labeling five components of parenting style. These were rejection-control, support, companionship, physical affection and withdrawal.

Another attempt to identify clusters of parent behavior was done by a review of literature. Rollins and Thomas (1979) looked at studies from 1960 to 1974, and further defined control and support, as well as differentiated a third component, power. The purpose of this review was to understand the influence of parental control attempts, support and power on socialization of children from preschool to college age.
They utilized the results of 176 studies. Parental support was defined as behavior of a parent which makes the child feel more comfortable. Controlling behaviors were attempts by the parent to control the child's behavior in a manner desirable to the parent. Control was subdivided into coercion which was a contest of wills; induction, an intent to obtain voluntary compliance; and love withdrawal which indicated disapproval of behavior. Power was differentiated from control, and was defined as the potential for getting another person to behave contrary to the individual's desires. Power was further subdivided into (1) outcome control or power where rewards are delivered according to compliance with parent demand, (2) expert power where the parent is regarded as having special knowledge, and (3) legitimate power where the parent has authority because of the parent role.

Literature in this field has been plagued with measurement difficulties and inadequate theoretical socialization models. One criticism was that previous studies emphasized a unidirectional model of interaction. The parent caused behavior in the child. This model negated the child as an actor and more research was elicited to understand the child's influence on the parent (Rollins & Thomas, 1979). Another difficulty was a problem of measurement. Data on parent behavior was collected by rating scales. This type of measurement often required the parent or child to rely on long-term memory. What was reported tended to become an average of responses over time rather than a parent behavior associated with a particular circumstance (Gerwitz, 1969). Furthermore, some studies relied on perceptions of children only to assess parent behavior. Child perceptions differed from parent and other observer perceptions as a result of parental absence (Bach, 1946),
age, socio-economic status, sex of parent and child (Goldin, 1969), and the negative or positive valence of the experience (Brook, Whiteman, Gordon, Brenden & Junishian, 1980). However, investigators supported the child's perception of parent behavior as providing a useful research base since children's behavior was based on the perception of a situation rather than what actually happened (Acock & Bengston, 1980, Brook et al., 1980, Walters & Stinnett, 1971).

Our data indicate that children do not perceive their parents' stated opinions accurately. Yet the perceived (attributed parental attitude) is a surprisingly high predictor of youth's attitude (Acock & Bengston, 1980, p. 511).

A fourth limitation was that studies were based on investigating singular parental qualities, e.g. withdrawal, rather than observing combinations of qualities. Martin (1975) suggested looking for configurations of variables, e.g. withdrawal and physical affection rather than correlating one quality with a behavior.

Only Anolik (1981) and Adams and Jones (1982) have addressed the relationship between egocentrism and parenting style in adolescents. Adams and Jones (1982) examined the relationship between parent-child socialization and adolescent egocentrism. Steinberg and Hill (1978) have indicated that parent/child interactions begin to change as the child's physical appearance alters with the onset of puberty. Building on that finding, Adams and Jones (1982) used approximately sixty boys and sixty girls from rural backgrounds to assess family interaction and imaginary audience behavior to understand how parental interactions affect imaginary audience behavior. Perceived rejection and control by mothers was associated with heightened imaginary audience behavior for boys.
Display of physical affection for both boys and girls was negatively associated with increased imaginary audience behavior. Thus, child-rearing styles appear to contribute to adolescent egocentrism. However, the investigators noted that further research was needed to control for onset of puberty, presence or absence of formal operational thought, and the inclusion of both perceived and actual parent-adolescent child-rearing interaction styles.

Anolik (1981) has based his research on the suggest that egocentrism in adolescents tends to make them critical of their relationships with others as a defense against their own feelings of inferiority. He compared the perceptions of parents and imaginary audience behavior for a sample of delinquent and nondelinquent fifteen year olds from a rural environment. Results indicated that delinquents experienced higher levels of egocentrism. Furthermore, this same group had more negative perceptions of fathers on the Parent Support Scale. Overall, less parental support correlated positively with the transient self aspect of egocentrism, but did not significantly affect the abiding self. Anolik suggested that less parental support in the family made it difficult for children to appreciate the views of others and this contributed to increased egocentrism in momentarily embarrassing situations.

Egocentrism and parental style may be better understood when egocentrism is related to the larger concept of self-esteem. Because Elkind and Bowen (1979) found a moderate negative relationship between abiding self aspects of egocentrism and self esteem, the following generalizations were reported based on self-esteem literature (Hamilton,
1977, Rollins & Thomas, 1979, Thomas, Gecas, Weigert & Rooney, 1974): (1) The greater the parental support, the greater the self-esteem in children; (2) The greater the parental control attempts (undifferentiated), the greater the self-esteem of children; (3) The greater the parental coercion, the less the self-esteem of children; and (4) The greater the parental induction, the greater the self-esteem of children. Recalling that egocentrism is negatively correlated with self-concept, based on past reviews, the following associations between egocentrism and perceived parenting style were predicted: (1) The greater the parental support, the less abiding self egocentrism in adolescents; (2) The greater the parental control attempts (undifferentiated), the less the abiding self egocentrism; (3) The greater the parental coercion, the greater the abiding self egocentrism of children; and (4) The greater the parental induction, the less the abiding self egocentrism of children.

Briefly then, the main factors considered in parent behavior were support and control. Power, a third factor was also believed to be important in changing a child's behavior. These concepts had been operationalized through behavior rating scales and further elaborated in literature reviews. Studies were limited by poor interaction models and measurement difficulties. Nevertheless, studies on egocentrism reported a relationship between imaginary audience behavior and perceived parenting styles.

Hypotheses

Egocentrism in human development was regarded as the inability to decenter from one's point of view. The imaginary audience was evidence
of one form of adolescent egocentrism and empirical studies supported its existence. Adolescent egocentrism was believed by David Elkind (1967) to be the product of the emergence of formal operational thought. This hypothesis reflected a cognitive model for the development of egocentrism. Other investigators suggested that perceived parenting style contributed to adolescent egocentrism and indicated that research exploring a socialization model was needed.

Based upon previous research and related speculation, the following hypotheses were tested.

It is believed that formal operational thought correlates positively with egocentrism. Therefore, it was hypothesized that:

1. The level of formal operational thought would correlate positively with the imaginary audience scale score for the entire sample.
2. The level of formal operational thought would correlate positively with the transient self score for the entire sample.
3. The level of formal operational thought would correlate positively with the abiding self score for the entire sample.

Presence of perceived rejection and control in parenting style is believed to correlate positively with adolescent egocentrism. Therefore, it was hypothesized that:

1. Perceived presence of rejection and control in paternal (maternal)* parenting style would correlate positively with the imaginary audience scale score for males (females)*.

*Note: Data parenthesized had individual analysis.
2. Perceived presence of rejection and control in paternal (maternal) parenting style would correlate positively with the transient self score for males (females).

3. Perceived presence of rejection and control in paternal (maternal) parenting style would correlate positively with the abiding self score for males (females).

It is believed that emotional support in perceived parenting styles correlates negatively with egocentrism. Therefore, it was hypothesized that:

1. Perceived presence of emotional support in paternal (maternal) parenting style would correlate negatively with the imaginary audience scale scores for males (females).
2. Perceived presence of emotional support in paternal (maternal) parenting style would correlate negatively with the transient score for males (females).
3. Perceived presence of emotional support in paternal (maternal) parenting style would correlate negatively with the abiding self scale score for males (females).

It is believed that physical affection in perceived parenting style correlates negatively with egocentrism. Therefore, it was hypothesized that:

1. Perceived presence of physical affect in paternal (maternal) parenting style would correlate negatively with the imaginary audience behavior for males (females).
2. Perceived presence of physical affect in paternal (maternal) parenting style would correlate negatively with the transient self score for males (females).
3. Perceived presence of physical affect in paternal (maternal) parenting style would correlate negatively with the abiding self score for males (females).

Withdrawal of attention is believed to correlate positively with egocentrism. Therefore, it was hypothesized that:

1. Perceived withdrawal of attention in paternal (maternal) parenting style would correlate positively with the imaginary audience scale score for males (females).

2. Perceived withdrawal of attention in paternal (maternal) parenting style would correlate positively with the transient self score for males (females).

3. Perceived withdrawal of attention in paternal (maternal) parenting style would correlate positively with the abiding self score for males (females).

Finally, it is hypothesized that parental socialization factors will contribute as much predictive variance as formal operational thought to egocentrism. Therefore, it was predicted that:

1. Perceived paternal (maternal) socialization factors would contribute as much predictive variance as formal operational thought to the imaginary audience scale score for the entire sample.

2. Perceived paternal (maternal) socialization factors would contribute as much predictive variance as formal operational thought to the transient self score for the entire sample.

3. Perceived paternal (maternal) socialization factors would contribute as much predictive variance as formal operational thought to the abiding self score for the entire sample.
CHAPTER III

METHODOLOGY

The accessible population for this study consisted of seventh grade males and females attending junior high school in Cache County School District. Only those students currently enrolled in the self-development course required at the seventh grade level for the second semester became the sample. The sampling of students in the self-development course was representative of the seventh graders in this school system since all were required to take the course and were assigned indiscriminately for one semester each year. Content of the class on self development involved orientation to the junior high school, understanding of the roles of authority, self-identity, cooperation, family togetherness, decision making, etc.

Cache County School District serves the suburban and rural areas surrounding Logan, Utah, a predominantly Mormon culture of approximately 50,000 people. Utah State University is located in Logan and is a state land grant college with an enrollment of approximately 10,000 students. Tables 1, 2, and 3 describe the sample according to distribution by sex, distribution by birth year and parents' occupational status.

Table 1

<table>
<thead>
<tr>
<th>Distribution of Sample by Sex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
</tbody>
</table>
The sample included 251 participants with a small majority of the subjects being male. Most of the sample was born in 1969 for a median age of thirteen years at the time the study was conducted. An occupational prestige score from the Occupational Classification Codes (Van Dusen & Zill, 1971) was assigned to each occupation cited.

Table 2
Distribution of Sample by Birth Year

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1967</td>
<td>1</td>
<td>.4</td>
</tr>
<tr>
<td>1968</td>
<td>46</td>
<td>18.3</td>
</tr>
<tr>
<td>1969</td>
<td>203</td>
<td>80.9</td>
</tr>
</tbody>
</table>

The prestige scores ranged from 82 for physician to 09 for bootblacks. The mean occupational status for fathers in this sample was 43.4. Representative occupations for this status value can be understood from examples given for those values in a range of 35 to 51. For those having an occupational status rating of 35, jobs included salesmen/clerks, clerical supervisors, dispatchers and proofreaders.
For those holding jobs with a status rating of 43, examples were teachers, postal clerks, real estate appraisers, dental assistants and foremen. Examples of a rating of 51 were computer specialists, health practitioners, surveyors, reporters, editors and managers. The mean occupational status for mothers in the sample was 30.39. Representative occupations for this number can be understood from examples in the range of occupations with ratings from 23 to 37. Those with a rating of 23 held jobs such as child care workers, crossing guards, housekeepers, health trainees, food service workers and gardeners. An occupational status score of 30 represented jobs like nurse's aides, seamstress, painters' apprentices, telegraph operators and cashiers. Those mothers having position with a status level of 37 were employed as clerical assistants, clerks mail carriers, proofreaders, teachers' aides and typists.

Subjects were also asked to indicate whether they lived on a family owned farm, rented a home outside city limits and were employed by a farm organization, lived in a home in the country with no industry attached, lived in a small town of less than 2,000 people, a large town from 2,000 to 5,000 people or a city of over 5,000. Over one third lived in a small town with another third living in a large town. Less than one percent indicated that they lived in a town of over five thousand. Another third lived out of the city limits with a majority of this percentage residing on family owned farms.

**Procedures and Materials**

Preliminary consent for this research was given by Mr. Ken Webb, assistant superintendent for research in the secondary schools in Cache
County School District, after review of the proposal and modifications to district specifications. No parents were permitted to be involved in the research, but two hours of seventh grade self-development classroom time were allotted to the researcher. Mr. Webb wrote to the two building principals at North Cache and South Cache Junior High Schools introducing the researcher and asking for their compliance in getting the research conducted at their schools. After the letter was received, the researcher contacted both principals who then made appointments with teachers of the self-development course. In a preliminary meeting with the instructors, arrangements were made to collect data during the first week in May, 1982. Data was collected at South Cache Junior High on Monday, Tuesday and Wednesday, while at North Cache Junior High it was completed on Thursday and Friday. One extra day was allotted for South Cache since an assembly program interfered with data collection in two classes. Arrangements were also made with additional school personnel for the use of videotape equipment.

Upon arrival at the classroom, the instructor introduced the researcher to the class by giving her name and indicating that she had some special activities that she would be telling them about. Introductory comments by the researcher included a brief statement indicating that she was interested in the way individuals behave and that some of the activities done in the classroom would help her better understand causes for behavior. She said that she would give a more specific description of why she was doing these activities after they were concluded. Rights of the students were also explained. She indicated to them that their participation was not connected with a grade received for the course, that information provided by them would remain
anonymous and that they could choose not to participate. This option was exercised by one in every classroom who continued to read while the measures were presented or did not record responses although they did attend to the measures. Presentation of the three measures was divided into two forty-minute periods, the time allotted by both junior high schools for each class period. During the first session, introductory comments were made, the answer booklets (Appendix B) passed to the participants, the Heilbrun-Schaefer Parent Perception Questionnaire read by the examiner and completed together as a class, the Imaginary Audience Scale items read by the examiner and completed together. The modified Classroom Test of Formal Operational Thought was completed, the names of respondents destroyed and a debriefing done by the researcher. At the request of individual junior high instructors the researcher spent additional time in the classroom discussing shyness, causes and possible aids to overcoming self-consciousness in return for being able to collect data from the classes. Teachers were present during the time the measures were presented to the class.

This procedure was followed in all classrooms except the one in which data were used to validate the Imaginary Audience Scale. The researcher chose the classroom before she had visited any of the sites. The choice was based upon the availability of video equipment and therefore the first class period after lunch at South Cache was chosen to enable the researcher to use the equipment. There was no reason to believe that this classroom was not representative of others used in the sample since students were assigned to this class period indiscriminately in the routine of scheduling. During this class period, the students were monitored by a video camera as they completed the
Imaginary Audience Scale and the Parent Perception Questionnaire. The video camera was operated by the self-development course instructor and he randomly chose students on whom to focus or scanned the classroom as a whole. Since the camera was equipped with a zoom lens, there were both close-up and distance shots of participants. These were visible to all students on a color monitor in front of the classroom. No videotape was actually made of the class completing the questionnaire. The students were informed of the reason for the monitoring following the collection of all data on the second day. Reasons for utilizing this procedure are presented in the measurements section.

**Design**

A correlational design (Campbell & Stanley, 1963) was used in this study. No randomized selection of subjects was used since the sample consisted of half the seventh graders already assigned randomly to first or second semester self-development courses. The criterion variable, adolescent egocentrism, was measured using the Imaginary Audience Scale with two subscales of transient and abiding self items. Two predictor variables, formal operational thought and perceived parenting styles were measured using a modified version of the Classroom Test of Formal Operational Thought (Lawson, 1978) and a modified version of the Heilbrun-Schaefer Parent Perception Questionnaire (Ellis, Thomas, & Rollins, 1976).
Instruments

Perceived Parenting Style

Ellis, Thomas and Rollins (1976) analyzed three widely used and promising parental support instruments to (a) discover how they interrelate, (b) assess whether the construct of parental support is unidimensional and, (c) determine whether multi-dimensional subscales with adequate reliability and validity could be created. The scales chosen were the Parent-Child Interaction Rating Scale (Heilbrun 1964, 1973), the Cornell Parent Behavior Description (Devereux et al., 1969) and the Parent Behavior Inventory (Schaefer, 1965). One sample utilized responses to the Heilbrun and Cornell measures while another utilized responses to the Heilbrun and Schaefer measures. The latter combination was regarded by the authors to provide more data about parental support since the Heilbrun and Cornell scales measured the same factors. Validity and reliability data on the Heilbrun and Schaefer scales were included here since the instrument used in this study was derived by this author from the combined scale used by Ellis, Thomas and Rollins (1976).

Ellis, Thomas and Rollins (1976) derived five dimensions of parenting style: rejection-control, support, companionship, physical affection and withdrawal. These five factors supported the hypothesis that parental support was multidimensional. Discriminate validity and internal consistency were reported for the combined measure, nine Heilbrun items and thirty Schaefer items. Internal consistency reliability coefficients of the factor extracted subscales ranged from .911 (rejection-control) to .849 (withdrawal) indicating adequate
internal consistency for each of the five dimensions. The highest positive relationship between subscales was between physical affect and support (.58). The largest negative correlation was between rejection-control and companionship (-.73) as would be expected. The Heilbrun items alone were correlated positively with communication from parent (.68) and self esteem (.13).

The instrument used in this research was derived by this author from the combined Heilbrun and Schaefer items used by Ellis, Thomas and Rollins (1976). The five items loading the highest on each subscale were chosen (Appendix C). To further assess validity of this new measure with a seventh grade sample, a factor analysis was completed. In the validation study of the measure, Ellis, Thomas and Rollins (1976) completed a factor analysis of the scale items using college students. This analysis provided construct validity for five subscales of parental support. Given that younger adolescents were used in this study, both the construct validity and internal consistency were reassessed. In the present study, adolescents responded to the instrument for both mothers and fathers. The items were then factor analyzed using a varimax (orthogonal) rotation procedure. The results of these analyses are summarized in Tables 4 and 5. Four significant factors emerged for both analyses. These factors are similar to those reported by Ellis, Thomas and Rollins (1976). Similar, but distinct, factors emerged for mothers and fathers. Drawing upon the original Ellis et al. factor analysis study, the factors were labeled emotional support, physical affect, rejection-control and withdrawal.

Reassessment of internal consistency of the four significant factors for both the mothers and fathers indicate strong internal con-
Table 4
Factor Analysis for Perceptions of Mothers

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor 1 (emotional support)</th>
<th>Factor 2 (physical affect)</th>
<th>Factor 3 (rejection-control)</th>
<th>Factor 4 (withdrawal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trusts me</td>
<td>.65 *</td>
<td>.11</td>
<td>-.19</td>
<td>-.06</td>
</tr>
<tr>
<td>Count on this parent to help out</td>
<td>.61 *</td>
<td>.18</td>
<td>-.04</td>
<td>-.14</td>
</tr>
<tr>
<td>Felt affection for me</td>
<td>.59 *</td>
<td>.22</td>
<td>-.18</td>
<td>-.15</td>
</tr>
<tr>
<td>Showed interest and support</td>
<td>.64 *</td>
<td>.11</td>
<td>-.11</td>
<td>-.07</td>
</tr>
<tr>
<td>Felt security in relationship</td>
<td>.78 *</td>
<td>.11</td>
<td>-.11</td>
<td>.00</td>
</tr>
<tr>
<td>Approved of me</td>
<td>.60 *</td>
<td>.15</td>
<td>-.27</td>
<td>-.04</td>
</tr>
<tr>
<td>Expressed physical affection</td>
<td>.47 *</td>
<td>.45 *</td>
<td>.00</td>
<td>-.08</td>
</tr>
<tr>
<td>Tells me how much s/he loves me</td>
<td>.13</td>
<td>.68 *</td>
<td>-.08</td>
<td>.01</td>
</tr>
<tr>
<td>Enjoyed trips with me</td>
<td>.16</td>
<td>.31 *</td>
<td>-.10</td>
<td>-.27</td>
</tr>
<tr>
<td>Hugged and kissed me often</td>
<td>.13</td>
<td>.72 *</td>
<td>-.07</td>
<td>-.04</td>
</tr>
<tr>
<td>Hugged and kissed me goodnight</td>
<td>.11</td>
<td>.60 *</td>
<td>-.10</td>
<td>-.04</td>
</tr>
<tr>
<td>Believed in showing love for me</td>
<td>.10</td>
<td>.62 *</td>
<td>-.10</td>
<td>-.09</td>
</tr>
<tr>
<td>Likes to talk and be with me</td>
<td>.24</td>
<td>.45 *</td>
<td>-.16</td>
<td>-.08</td>
</tr>
<tr>
<td>Item</td>
<td>Factor 1 (emotional support)</td>
<td>Factor 2 (physical affect)</td>
<td>Factor 3 (rejection-control)</td>
<td>Factor 4 (withdrawal)</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>------------------------------</td>
<td>-----------------------------</td>
<td>-----------------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>Is always finding fault</td>
<td>-.25</td>
<td>-.18</td>
<td>.64*</td>
<td>.19</td>
</tr>
<tr>
<td>Tells me how to behave</td>
<td>-.01</td>
<td>-.02</td>
<td>.52*</td>
<td>.17</td>
</tr>
<tr>
<td>Often complained about what I did</td>
<td>-.19</td>
<td>-.22</td>
<td>.58*</td>
<td>.31*</td>
</tr>
<tr>
<td>Always trying to change me</td>
<td>-.13</td>
<td>-.15</td>
<td>.57*</td>
<td>.08</td>
</tr>
<tr>
<td>Always getting after me</td>
<td>-.17</td>
<td>-.08</td>
<td>.61*</td>
<td>.14</td>
</tr>
<tr>
<td>Cold and distant when disapproving</td>
<td>.04</td>
<td>-.05</td>
<td>.00</td>
<td>.47*</td>
</tr>
<tr>
<td>Would not talk when I displeased</td>
<td>-.01</td>
<td>-.16</td>
<td>.19</td>
<td>.58*</td>
</tr>
<tr>
<td>Avoids looking at me</td>
<td>-.14</td>
<td>-.01</td>
<td>.26</td>
<td>.67*</td>
</tr>
<tr>
<td>Stopped talking if I hurt feelings</td>
<td>-.13</td>
<td>.04</td>
<td>.20</td>
<td>.55*</td>
</tr>
<tr>
<td>Won't have anything to do with me 'til I make up</td>
<td>-.19</td>
<td>-.04</td>
<td>.29</td>
<td>.51*</td>
</tr>
<tr>
<td>Percentage of Variance</td>
<td>53.9</td>
<td>18.7</td>
<td>13.7</td>
<td>8.2</td>
</tr>
</tbody>
</table>

Note: Asterisks indicate significant items for each factor.
## Table 5

Factor Analysis for Perceptions of Fathers

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor 1 (emotional support)</th>
<th>Factor 2 (rejection-control)</th>
<th>Factor 3 (physical affect)</th>
<th>Factor 4 (withdrawal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trusts me</td>
<td>.71*</td>
<td>.07</td>
<td>.21</td>
<td>.16</td>
</tr>
<tr>
<td>Count on me to help out</td>
<td>.73*</td>
<td>.00</td>
<td>.12</td>
<td>.09</td>
</tr>
<tr>
<td>Felt affection for me</td>
<td>.77*</td>
<td>.07</td>
<td>.13</td>
<td>.05</td>
</tr>
<tr>
<td>Showed interest and support</td>
<td>.79*</td>
<td>.04</td>
<td>.17</td>
<td>.02</td>
</tr>
<tr>
<td>Security in relationship</td>
<td>.79*</td>
<td>.04</td>
<td>.14</td>
<td>.05</td>
</tr>
<tr>
<td>Approved of me</td>
<td>.75*</td>
<td>.03</td>
<td>.10</td>
<td>.07</td>
</tr>
<tr>
<td>Expressed physical affection</td>
<td>.48*</td>
<td>.03</td>
<td>.58*</td>
<td>.01</td>
</tr>
<tr>
<td>Tells me how much he loves me</td>
<td>.54*</td>
<td>.14</td>
<td>.40*</td>
<td>-.01</td>
</tr>
<tr>
<td>Enjoyed trips with me</td>
<td>.64*</td>
<td>.05</td>
<td>.16</td>
<td>-.07</td>
</tr>
<tr>
<td>Hugged and kissed me often</td>
<td>.34*</td>
<td>.03</td>
<td>.74*</td>
<td>.04</td>
</tr>
<tr>
<td>Believed in showing love for me</td>
<td>.55*</td>
<td>.14</td>
<td>.53*</td>
<td>.07</td>
</tr>
<tr>
<td>Likes to talk and be with me</td>
<td>.69*</td>
<td>.09</td>
<td>.29</td>
<td>.04</td>
</tr>
<tr>
<td>Avoids talking to me if I hurt feelings</td>
<td>-.02</td>
<td>.34*</td>
<td>.14</td>
<td>.59*</td>
</tr>
</tbody>
</table>
Table 5 (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor 1 (emotional support)</th>
<th>Factor 2 (rejection-control)</th>
<th>Factor 3 (physical affect)</th>
<th>Factor 4 (withdrawal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is always finding fault with me</td>
<td>-.05</td>
<td>.73*</td>
<td>.00</td>
<td>.24</td>
</tr>
<tr>
<td>Tells me how I should behave</td>
<td>.19</td>
<td>.51*</td>
<td>.16</td>
<td>.17</td>
</tr>
<tr>
<td>Often complained about what I did</td>
<td>.00</td>
<td>.76*</td>
<td>-.02</td>
<td>.26</td>
</tr>
<tr>
<td>Always trying to change me</td>
<td>.11</td>
<td>.65*</td>
<td>-.04</td>
<td>.25</td>
</tr>
<tr>
<td>Is always getting after me</td>
<td>.06</td>
<td>.70*</td>
<td>.05</td>
<td>.22</td>
</tr>
<tr>
<td>Won't have anything to do with me when upset 'til I make up</td>
<td>.00</td>
<td>.35*</td>
<td>.08</td>
<td>.49*</td>
</tr>
<tr>
<td>Hugged and kissed me goodnight</td>
<td>.27</td>
<td>.02</td>
<td>.72*</td>
<td>.02</td>
</tr>
<tr>
<td>Cold and distant when disapproving</td>
<td>.13</td>
<td>.18</td>
<td>-.08</td>
<td>.57*</td>
</tr>
<tr>
<td>Stopped talking to me if I hurt feelings</td>
<td>.13</td>
<td>.20</td>
<td>-.11</td>
<td>.67*</td>
</tr>
<tr>
<td>Avoids looking at me if disappointed</td>
<td>-.02</td>
<td>.34*</td>
<td>.14</td>
<td>.59*</td>
</tr>
<tr>
<td>Percentage of Variance</td>
<td>53.7</td>
<td>28.4</td>
<td>8.6</td>
<td>6.1</td>
</tr>
</tbody>
</table>

Note: Asterisks indicate significant items for each factor.
sistency for all factor scales. As Tables 6 and 7 summarize, the alpha coefficients range from a low of .75 to a high of .92.

In that the factor analysis and alpha coefficients are similar to those reported in the earlier study using college students, it must be concluded that the four factor scales are psychometrically appropriate for use with younger adolescents.

Table 6

<table>
<thead>
<tr>
<th>Scales</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional Support</td>
<td>.834</td>
</tr>
<tr>
<td>Physical Affect</td>
<td>.753</td>
</tr>
<tr>
<td>Rejection/Control</td>
<td>.772</td>
</tr>
<tr>
<td>Withdrawal</td>
<td>.747</td>
</tr>
</tbody>
</table>

Table 7

<table>
<thead>
<tr>
<th>Scales</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional Support</td>
<td>.919</td>
</tr>
<tr>
<td>Rejection/Control</td>
<td>.840</td>
</tr>
<tr>
<td>Physical Affect</td>
<td>.828</td>
</tr>
<tr>
<td>Withdrawal</td>
<td>.775</td>
</tr>
</tbody>
</table>

Imaginary Audience Behavior

Adolescent egocentrism was measured using the Elkind and Bowen (1979) Imaginary Audience Scale (Appendix D). The Imaginary Audience
Scale (IAS) consists of twelve items measuring either transient self (TS) or abiding self (AS) responses as well as a total IAS score. Subjects were required for each item to choose one of three responses: (a) an unwillingness to participate (2 points), (b) indifference (1 point), and (c) willingness to participate (0 points). High scores indicated unwillingness to expose a transient or abiding self due to belief in an imaginary audience.

Reliability and validity evidence for the Imaginary Audience Scale has been provided by Elkind and Bowen (1979) and Adams and Jones (1980). Both found the scales to have adequate internal consistency. Adams and Jones (1980) provide alpha coefficients for a junior and senior high school sample (TS scale = .74, AS scale = .84 and IAS = .87). These results were similar to those reported by Elkind and Bowen (1979) (TS scale = .66, AS scale = .62, IAS = .65). Validity data were provided by item-total correlations as well as comparisons to other constructs. Adams and Jones (1980) found individual items correlated most strongly with the overall IAS while Elkind and Bowen (1979) found the items to correlate most strongly with the subscale score, e.g., transient self items correlated more strongly with the transient self subscale score than the overall imaginary audience score. The IAS was found to have no correlation with locus of control and moderate correlation with self-concept and self-esteem (Elkind & Bowen, 1979). Adams and Jones (1980) found no clear evidence that imaginary audience behavior correlated with empathy.

To test the validity of the Imaginary Audience Scale for this sample to predict unwillingness to be self-revealing, a further
assessment was done. Imaginary audience behavior was regarded as a private construct, the way an adolescent thought of self. Ratings by others were inappropriate for validating this scale since others had no knowledge of IAS beliefs. However, researchers studying self-consciousness from subjects exposed to an experimental condition have attained higher ratings of self-consciousness from subjects exposed to an experimental condition to increase this characteristic, e.g., taking a self-consciousness scale in front of a mirror, camera or observers (Buss & Scheier, 1976; Carver & Scheier, 1978; Fenigstein, Scheier & Buss, 1975; Wicklund & Duval, 1971). The construct validity of the IAS was tested by having one classroom complete the IAS in the presence of video equipment. This author predicted a higher IAS score in an increased self-consciousness condition. Table 8 indicates that subjects in the high self-awareness condition did score significantly higher on the IAS, \( t(283) = 1.91, \ p < .05 \). The mean differences were small, but nonetheless significant. This finding suggests further research on the construct validity of the IAS is needed.

To reassess the reliability of the IAS instrument with seventh grade children, alpha coefficients were computed for all three scales. In Table 9, alpha coefficients are summarized for the three scales. These coefficients are similar to those reported by Elkind and Bowen (1979). Further, correlations between the TS and AS subscales (see Table 10) indicate that these two scales correlate highly with the overall scale but are only modestly correlated themselves. Collectively, these data are congruent with those reported by Elkind and Bowen (1979) and Adams and Jones (1980). Thus, the general internal consistency of the scales is replicable with a seventh grade sample.
Table 8
T-Tests on High and Low Self-Consciousness Conditions for the Imaginary Audience Scale

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>S.D.</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Low Self-consciousness)</td>
<td>12.55</td>
<td>3.88</td>
<td>.245</td>
</tr>
<tr>
<td>Group 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(High Self-consciousness)</td>
<td>12.62</td>
<td>2.87</td>
<td>.481</td>
</tr>
</tbody>
</table>


Table 9
Alpha Internal-Consistency Reliability Coefficients for Imaginary Audience Scale and Subscales

<table>
<thead>
<tr>
<th>Scales</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abiding Self</td>
<td>.600</td>
</tr>
<tr>
<td>Transient Self</td>
<td>.557</td>
</tr>
<tr>
<td>Imaginary Audience</td>
<td>.668</td>
</tr>
</tbody>
</table>

Table 10
Correlation Between Abiding Self Scale, Transient Self Scale and Imaginary Audience Scale

<table>
<thead>
<tr>
<th></th>
<th>AS</th>
<th>TS</th>
<th>IAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abiding Self</td>
<td></td>
<td>.35*</td>
<td>.78*</td>
</tr>
<tr>
<td>Transient Self</td>
<td></td>
<td></td>
<td>.79*</td>
</tr>
</tbody>
</table>

*p s ≤ .05
Formal Operational Thought

Level of formal operational thought was measured using a modified version of the Classroom Test of Formal Operations (Lawson, 1978). In its original form, this was a fifteen item test which required apparatus to be demonstrated in front of the classroom while each subject marked the correct answer and explanation for the answer in the scoring booklet. Both reasoning and correct answer had to be accurate to score one point. The test in its entirety took from 75-100 minutes to administer. For this reason ten of the fifteen items were chosen to shorten the administration time to accommodate the junior high classroom period. A copy of the modified measure is found in Appendix E. The items test the following dimensions: Concrete and early formal operations (Items 1, 2), controlling variables (Items 3, 4), proportional reasoning (Items 5, 6), combinatorial reasoning (Item 7, 8) and probability (Items 9, 10). Items reported by Lawson (Personal communication, 1982) as easiest to answer were included in the modified version to accommodate an early adolescent research sample. The ten final items were representative of the original areas of formal operational thought as operationalized by Lawson (1978).

Test-retest reliability on the original measure was $r = .78$. Lawson (1978) reported face validity, convergent validity and factorial construct validity. To establish face validity he had six judges with professional involvement in studying Piagetian individual interview tasks indicate whether the classroom test (CTFOT) required concrete and/or formal reasoning. There was 100% agreement among judges that it represented formal reasoning skills. To establish convergent validity, he correlated the classroom measure with scores on Piagetian tasks.
administered in the individual interview format to 72 students. Total scores on the classroom test (CTFOT) correlated .76 with the combined bending rods and balance beam task responses administered in the individual interview format. The classroom test was assumed to be measuring the same psychological parameter, formal thought. Finally, three factors emerged in the study of factorial construct validity. Tasks requiring proportional and combinatorial reasoning, probabilities and controlling of variables loaded .64 to .77 on the factor labeled formal operational thought. Conservation of volume loaded .82 on the second factor with controlling variables .39. This factor was labeled early formal operations. Conservation of weight loaded .89 on the third factor and was labeled concrete reasoning. Lawson hypothesized that controlling variables items loaded on the early formal operations factor because they involved familiar variables (e.g., length and weight) and did not require the subject to be fully formal operational for successful completion of the response.

In devising a method for classroom teachers to categorize developmental levels of students, Lawson used a contingency table where he again compared performance on the CTFOT to test scores on the bending rods and balance beam tasks. Those found to be concrete operational thinkers on the Piagetian tasks had scores from 0-5 on the CTFOT. Those who were transitional scored 6-11 and those who were formal operational had scores of 12-15. Lawson cautioned that although the student was categorized as being at one developmental level, each had a different pattern for successful completion of tasks.

Scores from the CTFOT modified by this author were entered in two ways in this research. First, a category score was entered (concrete,
early formal, and formal operational). These were derived from Lawson's original classification by reducing the number of items in the three factor groups by one-third. This corresponded with the total number of test items being reduced by one third in the modified version. Therefore, concrete operational thought which originally included successful completion of 0-5 items was reduced to 0-3. Early formal operational thought was reduced to 4-7 successfully completed items and formal operational thought required 8-10 items passed. The second score entered from the CTFOT modified by this author was the total number of items competed correctly.

One additional modification of this instrument was made to facilitate presentation. This modification was designed to put the instrument on video tape with a limited time between tasks for recording answers. This was previously undertaken by Tobin and Capie (1981). It is not known to what extent the measure used in this research is similar to the Tobin and Capie measure since it was not available. They constructed a forty minute test from the original Lawson items with videotaped instructions and a choice of responses in the answer booklet. It is not known which items in particular were chosen for the Test of Logical Thought (TOLT) (Tobin & Capie, 1981), but the five areas represented in this research were also included by Tobin and Capie. On a sample of 682 students, an alpha coefficient of .85 was obtained. Internal consistency estimates of each two-item subtest moderately ranged from .56 to .82. Performance on the five modes of reasoning was moderately intercorrelated. Criterion-related validity in which the TOLT scores were correlated with the interview technique resulted in a coefficient of .80.
The CTFOT was modified in two ways by this author to study egocentrism. The number of items was reduced and presentation was done on videotape. To reassess reliability across the five dimensions of formal operational thought, split-half reliability coefficients were determined as well as correlations between all items. Table 11 indicates that significant but modest correlations exist between most items. In part, the modest correlations are reflected by the wide range of individual abilities to do formal operational thought which exist for 7th graders. As Table 12 indicates the majority of children at this age missed one or more of the items for each scale. However, a significant group of children were able, even in the seventh grade, to complete most or all of the items. The modified CTFOT provides both raw score and stage of thought (concrete, early formal and formal operational). From the total of 251 students, 184 children were concrete operational, 63 were early formal operational, and 4 were formal operational. Finally, in Table 13 each subscale of the modified CTOFT was correlated with the total scale score. As the table outlines, each scale held a relatively strong and significant association with the total construct of formal operational thought.
Table 11
Pearson Correlations Between Items in Formal Operational Thought Categories

<table>
<thead>
<tr>
<th></th>
<th>Concrete Operations</th>
<th>Controlling Variables</th>
<th>Proportional Reasoning</th>
<th>Combinatorial Reasoning</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Concrete Operations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1.00</td>
<td>.15*</td>
<td>.14*</td>
<td>.15*</td>
<td>.11*</td>
</tr>
<tr>
<td>2</td>
<td>1.00</td>
<td>.20*</td>
<td>.27*</td>
<td>.11*</td>
<td>.11*</td>
</tr>
<tr>
<td>Controlling Variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>1.00</td>
<td>.60*</td>
<td>.21*</td>
<td>.10*</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>1.00</td>
<td>.16*</td>
<td>.02</td>
<td>.20*</td>
</tr>
<tr>
<td>Proportional Reasoning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td>1.00</td>
<td>.27*</td>
<td>.12*</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td>1.00</td>
<td>.24</td>
<td>.27</td>
</tr>
<tr>
<td>Combinatorial Reasoning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
</tr>
<tr>
<td>Probability</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
</tr>
</tbody>
</table>

NOTE: Those items with an asterisk are significant, p<.05.
Table 12
Percentage of Items Completed Correctly Within Formal Operational Thought Categories

<table>
<thead>
<tr>
<th></th>
<th>Missed Both</th>
<th>One Correct</th>
<th>Two Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Operations (Items 1, 2)</td>
<td>14.7</td>
<td>50.2</td>
<td>35.1</td>
</tr>
<tr>
<td>Controlling Variables (Items 3, 4)</td>
<td>72.1</td>
<td>13.6</td>
<td>14.3</td>
</tr>
<tr>
<td>Proportional Reasoning (Items 5, 6)</td>
<td>71.7</td>
<td>25.5</td>
<td>2.8</td>
</tr>
<tr>
<td>Combinatorial Reasoning (Items 7, 8)</td>
<td>82.9</td>
<td>14.8</td>
<td>2.4</td>
</tr>
<tr>
<td>Probability (Items 9, 10)</td>
<td>64.9</td>
<td>23.1</td>
<td>12.0</td>
</tr>
</tbody>
</table>

Table 13
Correlation of Categories of Tasks with Total Formal Operational Thought Score

<table>
<thead>
<tr>
<th>Categories of Tasks</th>
<th>Pearson r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Operations</td>
<td>.66</td>
</tr>
<tr>
<td>Controlling Variables</td>
<td>.71</td>
</tr>
<tr>
<td>Proportional Reasoning</td>
<td>.54</td>
</tr>
<tr>
<td>Combinatorial Reasoning</td>
<td>.52</td>
</tr>
<tr>
<td>Probability</td>
<td>.66</td>
</tr>
</tbody>
</table>
Data Analyses

The belief that adolescent egocentrism correlated positively with other psychological variables was analyzed using three statistical procedures. First Pearson r correlations were computed for the raw scores on the modified Classroom Test of Formal Operational Thought and the Imaginary Audience Scale, the transient self score and the abiding self score. Second, a simple regression was completed using the raw score from the modified Classroom Test of Formal Operational Thought on the imaginary audience, transient self, and abiding self scores. Finally, a sex by cognitive stage analysis of variance was computed for abiding self, transient self and imaginary audience scores.

All of the associations of perceived parenting factors with imaginary audience, transient self and abiding self scores were computed using stepwise forward multiple regression. This was completed for maternal and paternal perceived styles for males, females and the total sample. Further a stepwise forward regression analysis of perceived parenting styles on the raw score for formal operational thought was completed.

A comparison of the predictive variance for perceived parenting style and raw score for formal operational thought did not involve further data analyses. Rather comparisons of the regression analysis were undertaken. Beta weights were compared for each maternal and paternal parenting factor on imaginary audience, transient self, and abiding self scores. The Beta weights for formal operational thought were included as well.

All hypotheses were tested against a significance level of p<.05.
CHAPTER IV

RESULTS

Formal Operations and Egocentrism

The earlier theoretical proposition on the relationship between these two constructs was advanced by David Elkind (1967) and is represented in the first hypotheses. To test this proposed relationship, three related but distinctly different analyses were undertaken. Each of the scales of the IAS were correlated with the raw scores of the modified CTFOT and the stage score as shown in Table 14. Significant negative correlations were observed for the TS and IAS. No statistically significant relationship was observed for the AS subscale. These initial analyses suggest, contrary to the earlier theoretical notions of Elkind, that egocentrism is actually negatively correlated with formal thought. Similar conclusions can be drawn from Table 15 where the results of the regression of IAS scores on the modified CTFOT measure are shown. Once again, when significance occurred the relationship was negative. Further analyses of variance using a Sex X Stage factorial was also computed. Significant sex effects were found for the AS ($F_{[1,245]}=5.09, p<.03$), and IAS ($F_{[1,245]}=6.45, p<.01$) scales. On both of these scales, females scored higher than males on egocentrism. However, no sex by stage interaction was present. A main effect for stage of formal operational thought was observed for the TS scale scores ($F_{[2,245]}=4.96, p<.008$), with a nonsignificant trend for the IAS ($F_{[2,245]}=2.74, p<.07$). The mean differences for the TS scale
Table 14

Correlation of Formal Operational Thought with Egocentrism

<table>
<thead>
<tr>
<th></th>
<th>Total Sample</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Items Correct</td>
<td>Stage</td>
<td>Items Correct</td>
<td>Stage</td>
<td>Items Correct</td>
</tr>
<tr>
<td>Abiding Self</td>
<td>-.07</td>
<td>-.01</td>
<td>-.09</td>
<td>-.01</td>
<td>-.05</td>
</tr>
<tr>
<td>Transient Self</td>
<td>-.24*</td>
<td>-.19*</td>
<td>-.28*</td>
<td>-.23*</td>
<td>-.20*</td>
</tr>
<tr>
<td>Imaginary Audience</td>
<td>-.20*</td>
<td>-.13*</td>
<td>-.23*</td>
<td>-.14*</td>
<td>-.15*</td>
</tr>
<tr>
<td>Scale</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Asterisks indicate significance at $p < .05$. 
Table 15
Simple Regression Between Egocentrism and Formal Operational Thought

<table>
<thead>
<tr>
<th></th>
<th>Abiding Self</th>
<th></th>
<th>Transient Self</th>
<th></th>
<th>Imaginary Audience</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Total</td>
<td>Male</td>
<td>Female</td>
<td>Total</td>
</tr>
<tr>
<td>Multiple R</td>
<td>.09</td>
<td>.05</td>
<td>.07</td>
<td>.28</td>
<td>.20</td>
<td>.24</td>
</tr>
<tr>
<td>$R^2$</td>
<td>.008</td>
<td>.002</td>
<td>.004</td>
<td>.08</td>
<td>.04</td>
<td>.06</td>
</tr>
<tr>
<td>Beta</td>
<td>-.09</td>
<td>-.05</td>
<td>-.07</td>
<td>-.28</td>
<td>-.20</td>
<td>-.24</td>
</tr>
<tr>
<td>F. Value</td>
<td>1.11</td>
<td>.25</td>
<td>1.22</td>
<td>11.03*</td>
<td>4.70*</td>
<td>15.80*</td>
</tr>
</tbody>
</table>

NOTE: Full model df = 4,246.
Asterisks indicate significance at $p < .05$. 
were provided in Table 16. Collectively, these data indicate that there is a negative relationship between formal operational thought and egocentrism. However, the relationship is primarily associated with the transient self dimension of egocentrism as operationalized by the Imaginary Audience Scale.

**Table 16**

<table>
<thead>
<tr>
<th>Stage</th>
<th>$\bar{x}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Operational Thought</td>
<td>6.43</td>
</tr>
<tr>
<td>Early Formal Operational Thought</td>
<td>5.45</td>
</tr>
<tr>
<td>Formal Operational Thought</td>
<td>2.64</td>
</tr>
</tbody>
</table>

**Childrearing Styles and Egocentrism**

An alternative to the cognitive theory of egocentrism formation has been advanced by Adams and Jones (1982). More specifically, these investigators have proposed that family socialization experiences may heighten adolescent egocentrism. To test the proposed relation between childrearing experiences and egocentrism, a series of multiple stepwise regression statistics were computed. Parent perception scores on the four factor scales were regressed on the three scales of the IAS. Analyses were computed separately for responses to perceived father and mother childrearing behavior. Regression statistics were reported in the text. However, readers interested in simple and partial correlations should see Appendix F.
Abiding self. The multiple regression data reported in Table 17 indicate that there was no significant relation between maternal support and abiding egocentrism. However, as shown in Table 18, three significant relationships emerged for perceived paternal support. First, physical affect held a significant negative relation with abiding self behavior for males. Second, rejection-control held a positive relation for girls. Finally, emotional support was negatively correlated with abiding self responses for females. Thus, more affectionate fathers appeared to diminish abiding self egocentrism for boys, while emotional support from fathers diminished it for girls. Paternal rejection-control heightened egocentrism for girls.

Transient self. As Table 19 summarizes for the total sample, all four factors on the perceived maternal support measure contributed to egocentrism. More specifically, emotional support, physical affect, and rejection-control were associated with diminished egocentrism, while maternal withdrawal heightened egocentrism. Only one significant sex related finding was observed. Emotional support, once again, was negatively related with transient self egocentrism for girls.

A somewhat different, but significant picture emerges from the data on perceived paternal support and transient self scores (see Table 20). For the total sample, emotional support and rejection-control diminished egocentrism, while physical affect and withdrawal were associated with heightened transient self responses. Several sex differences were observed. Emotional support was negatively associated with transient self responses while physical affect was correlated with heightened transient self behavior for females only.
**Table 17**

Multiple Regression of Perceived Maternal Support Factors on Abiding-Self Subscale

<table>
<thead>
<tr>
<th></th>
<th>Emotional Support</th>
<th>Physical Affect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Multiple R</td>
<td>.23</td>
<td>.12</td>
</tr>
<tr>
<td>$R^2$</td>
<td>.05</td>
<td>.01</td>
</tr>
<tr>
<td>Beta</td>
<td>-.05</td>
<td>.03</td>
</tr>
<tr>
<td>F Value</td>
<td>1.75</td>
<td>0.56</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Rejection-Control</th>
<th>Withdrawal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Multiple R</td>
<td>.27</td>
<td>.00</td>
</tr>
<tr>
<td>$R^2$</td>
<td>.04</td>
<td>.00</td>
</tr>
<tr>
<td>Beta</td>
<td>-.18</td>
<td>.00</td>
</tr>
<tr>
<td>F Value</td>
<td>2.84</td>
<td>0.00</td>
</tr>
</tbody>
</table>

**NOTE:** Full model of $N = 4,246$.

Asterisk indicates significance at $p < .05$. 
Table 18

Multiple Regression of Perceived Paternal Support Factors on Abiding Self Subscale

<table>
<thead>
<tr>
<th></th>
<th>Emotional Support</th>
<th>Physical Affect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Multiple R</td>
<td>.21</td>
<td>.25</td>
</tr>
<tr>
<td>$R^2$</td>
<td>.04</td>
<td>.06</td>
</tr>
<tr>
<td>Beta</td>
<td>.12</td>
<td>-.12</td>
</tr>
<tr>
<td>F Value</td>
<td>2.91</td>
<td>3.87*</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Rejection-Control</th>
<th>Withdrawal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Multiple R</td>
<td>.00</td>
<td>.20</td>
</tr>
<tr>
<td>$R^2$</td>
<td>.00</td>
<td>.04</td>
</tr>
<tr>
<td>Beta</td>
<td>.00</td>
<td>.20</td>
</tr>
<tr>
<td>F Value</td>
<td>.00</td>
<td>5.07*</td>
</tr>
</tbody>
</table>

NOTE: .00 = numerical value too small for computation.
Table 19

Multiple Regression for Perceived Maternal Support Factors on Transient Self Subscale

<table>
<thead>
<tr>
<th></th>
<th>Emotional Support</th>
<th>Physical Affect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td><strong>Multiple R</strong></td>
<td>.24</td>
<td>.22</td>
</tr>
<tr>
<td><strong>R^2</strong></td>
<td>.06</td>
<td>.05</td>
</tr>
<tr>
<td><strong>Beta</strong></td>
<td>-.12</td>
<td>-.20</td>
</tr>
<tr>
<td><strong>F Value</strong></td>
<td>2.69</td>
<td>6.06*</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Rejection Control</th>
<th>Withdrawal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td><strong>Multiple R</strong></td>
<td>.20</td>
<td>.28</td>
</tr>
<tr>
<td><strong>R^2</strong></td>
<td>.04</td>
<td>.08</td>
</tr>
<tr>
<td><strong>Beta</strong></td>
<td>-.19</td>
<td>-.19</td>
</tr>
<tr>
<td><strong>F Value</strong></td>
<td>2.57</td>
<td>3.22</td>
</tr>
</tbody>
</table>

NOTE: Full model df = 4,246.
Asterisks indicated significance at p < .05.
Table 20

Multiple Regression of Perceived Paternal Support Factors on Transient Self Subscale

<table>
<thead>
<tr>
<th></th>
<th>Emotional Support</th>
<th>Physical Affect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Multiple R</td>
<td>.23</td>
<td>.21</td>
</tr>
<tr>
<td>R²</td>
<td>.05</td>
<td>.04</td>
</tr>
<tr>
<td>Beta</td>
<td>-.25</td>
<td>-.46</td>
</tr>
<tr>
<td>F Value</td>
<td>3.57</td>
<td>5.28*</td>
</tr>
<tr>
<td></td>
<td>Rejection-Control</td>
<td>Withdrawal</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Multiple R</td>
<td>.24</td>
<td>.28</td>
</tr>
<tr>
<td>R²</td>
<td>.06</td>
<td>.08</td>
</tr>
<tr>
<td>Beta</td>
<td>-.12</td>
<td>-.11</td>
</tr>
<tr>
<td>F Value</td>
<td>2.62</td>
<td>2.44</td>
</tr>
</tbody>
</table>

NOTE: Full model df = 4,246

Asterisks indicate significance at p < .05.
Imaginary audience. As Table 21 summarizes, the four factors of perceived parenting style contributed to the full model of egocentrism. For the total sample, three maternal support factors (emotional support, physical affect, rejection-control) were negatively correlated with the total imaginary audience score. Only maternal withdrawal was positively related to heightened egocentrism. Three significant relationships emerged for males and maternal support factors. Physical affect and rejection-control were negatively associated with egocentrism while withdrawal was once again associated positively with egocentrism.

The full model for the total sample in Table 22 was significant. Overall, emotional support and rejection-control by fathers was predictive of lower imaginary audience behavior while physical affection and withdrawal heightened imaginary audience scores.

Childrearing Styles and Formal Operations

While there was no specific hypothesis on the relationship between childrearing styles and formal operations, exploratory analyses were undertaken to assess this possibility. Tables 23 and 24 summarize the relation between maternal and paternal childrearing styles and formal operations. For the total sample, emotional support, physical affect, and rejection-control were predictive of more advanced formal operational thought for the perceived maternal measures. Once again, withdrawal held a negative relationship with formal operations. For both males and females, emotional support and physical affect were positively associated with formal operations development. For males only, rejection-control and withdrawal were predictive of formal opera-
Table 21

Multiple Regression of Perceived Maternal Support Factors on Imaginary Audience Scale Score

<table>
<thead>
<tr>
<th></th>
<th>Emotional Support</th>
<th>Physical Affect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Multiple R</td>
<td>.32</td>
<td>.17</td>
</tr>
<tr>
<td>R²</td>
<td>.10</td>
<td>.03</td>
</tr>
<tr>
<td>Beta</td>
<td>-.05</td>
<td>-.11</td>
</tr>
<tr>
<td>F Value</td>
<td>3.64</td>
<td>3.38</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Rejection-Control</th>
<th>Withdrawal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Multiple R</td>
<td>.26</td>
<td>.21</td>
</tr>
<tr>
<td>R²</td>
<td>.07</td>
<td>.04</td>
</tr>
<tr>
<td>Beta</td>
<td>-.26</td>
<td>-.13</td>
</tr>
<tr>
<td>F Value</td>
<td>4.71*</td>
<td>1.70</td>
</tr>
</tbody>
</table>

NOTE: Full model df = 4,246.

Asterisks indicate significance at p < .05.
Table 22

Multiple Regression of Perceived Paternal Support Factors on Imaginary Audience Scale Score

<table>
<thead>
<tr>
<th></th>
<th>Emotional Support</th>
<th></th>
<th>Physical Affect</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Total</td>
<td>Male</td>
</tr>
<tr>
<td>Multiple R</td>
<td>.19</td>
<td>.21</td>
<td>.18</td>
<td>.25</td>
</tr>
<tr>
<td>R²</td>
<td>.04</td>
<td>.05</td>
<td>.03</td>
<td>.06</td>
</tr>
<tr>
<td>Beta</td>
<td>-.16</td>
<td>-.36</td>
<td>-.31</td>
<td>-.10</td>
</tr>
<tr>
<td>F Value</td>
<td>4.70*</td>
<td>5.56*</td>
<td>7.93*</td>
<td>2.92</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Rejection-Control</th>
<th>Withdrawal</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Total</td>
<td>Male</td>
</tr>
<tr>
<td>Multiple R</td>
<td>.25</td>
<td>.26</td>
<td>.22</td>
<td>.25</td>
</tr>
<tr>
<td>R²</td>
<td>.06</td>
<td>.07</td>
<td>.05</td>
<td>.06</td>
</tr>
<tr>
<td>Beta</td>
<td>-.04</td>
<td>.03</td>
<td>-.04</td>
<td>.20</td>
</tr>
<tr>
<td>F Value</td>
<td>2.20</td>
<td>2.14</td>
<td>3.24*</td>
<td>4.14*</td>
</tr>
</tbody>
</table>

NOTE: Full model df = 4,246.

Asterisks indicate significance at p < .05.
Table 23

Multiple Regression of Perceived Maternal Support Factors on Formal Operational Thought

<table>
<thead>
<tr>
<th></th>
<th>Emotional Support</th>
<th>Physical Affect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td><strong>Multiple R</strong></td>
<td>.29</td>
<td>.27</td>
</tr>
<tr>
<td><strong>R²</strong></td>
<td>.09</td>
<td>.07</td>
</tr>
<tr>
<td><strong>Beta</strong></td>
<td>.16</td>
<td>.18</td>
</tr>
<tr>
<td><strong>F Value</strong></td>
<td>6.02*</td>
<td>4.69*</td>
</tr>
<tr>
<td></td>
<td><strong>Rejection-Control</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td><strong>Multiple R</strong></td>
<td>.30</td>
<td>.30</td>
</tr>
<tr>
<td><strong>R²</strong></td>
<td>.09</td>
<td>.09</td>
</tr>
<tr>
<td><strong>Beta</strong></td>
<td>.08</td>
<td>-.09</td>
</tr>
<tr>
<td><strong>F Value</strong></td>
<td>4.21*</td>
<td>2.78</td>
</tr>
</tbody>
</table>

**NOTE:** Full model df = 4,246.

Asterisks indicate significance at p < .05.
Table 24

Multiple Regression of Perceived Paternal Support Factors On Formal Operational Thought

<table>
<thead>
<tr>
<th></th>
<th>Emotional Support</th>
<th>Physical Affect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Multiple R</td>
<td>.10</td>
<td>.19</td>
</tr>
<tr>
<td>$R^2$</td>
<td>.01</td>
<td>.04</td>
</tr>
<tr>
<td>Beta</td>
<td>.24</td>
<td>.13</td>
</tr>
<tr>
<td>F Value</td>
<td>1.28</td>
<td>2.30</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Rejection-Control</th>
<th>Withdrawal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Multiple R</td>
<td>.18</td>
<td>.14</td>
</tr>
<tr>
<td>$R^2$</td>
<td>.03</td>
<td>.02</td>
</tr>
<tr>
<td>Beta</td>
<td>.08</td>
<td>-.14</td>
</tr>
<tr>
<td>F Value</td>
<td>1.11</td>
<td>2.37</td>
</tr>
</tbody>
</table>

NOTE: Full model df = 4,246.
Asterisks indicate significance at $p < .05$. 
tional behavior. Rejection-control held a positive and withdrawal a negative relation. Fathers perceived support was predictive of formal operations on two dimensions for the total sample. Supportive fathers were associated with advanced formal operational thought, while withdrawn fathers had a negative impact on this same cognitive skill.

These exploratory analyses suggest not only are childrearing perceptions correlated with egocentrism, but much is yet to be discovered between childrearing and formal operational thought development.

**Theoretical Comparisons**

The present investigation has argued that two potential theoretical perspectives might account for egocentrism behavior in young adolescents. Table 25 contrasts the significant Beta weights for each of the two theoretical perspectives. Elkind has proposed a significant positive relation between the onset of formal operations and egocentrism. However, in the present investigation the relationship, while being significant, was just the converse. Previous research by Adams and Jones (1982) has predicted that rejection-control would be positive and physical affect negatively related to self-consciousness. Further, their data reported that rejection-control was most important in predicting self-consciousness for boys and physical affect the most important for girls. The findings in the present study only partially confirm the earlier investigation. For both mothers and fathers, emotional support and rejection-control held a negative relation with imaginary audience behavior. Further, for both parents, withdrawal behavior was associated with heightened self-consciousness. Finally, physical affect for mothers diminished egocentrism, while for fathers it heightened egocentrism scores.
Table 25
Beta Weights for Perceived Parental Style and Cognitive Development as Related to Imaginary Audience Scale

<table>
<thead>
<tr>
<th>Perceived Parental Style</th>
<th>Abiding Self Subscale</th>
<th>Transient Self Subscale</th>
<th>Imaginary Audience Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional Support</td>
<td>--</td>
<td>-.16 (-.33)</td>
<td>-.10 (-.31)</td>
</tr>
<tr>
<td>Physical Affect</td>
<td>--</td>
<td>-.03 (+.21)</td>
<td>-.10 (+.15)</td>
</tr>
<tr>
<td>Rejection/Control</td>
<td>--</td>
<td>-.20 (-.12)</td>
<td>-.23 (-.04)</td>
</tr>
<tr>
<td>Withdrawal</td>
<td>--</td>
<td>+.22 (+.21)</td>
<td>+.21 (+.14)</td>
</tr>
<tr>
<td>Cognitive Development</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formal Operations</td>
<td>--</td>
<td>-.24</td>
<td>-.20</td>
</tr>
</tbody>
</table>

*a Parentheses indicate Beta weights from paternal support for total sample while nonparenthesized indicates maternal support for entire sample.

*b Only significant results were reported.
Results Summary

Statistically significant results warrant the following statements regarding the hypotheses.

Formal operational thought correlated negatively with egocentrism. Specifically:

1. The level of formal operational thought correlated negatively with the imaginary audience scale score for the entire sample.
2. The level of formal operational thought correlated negatively with the transient self score for the entire sample.
3. There was no statistically significant correlation between formal operational thought and the abiding self score for the entire sample.

Presence of rejection and control correlated negatively with egocentrism behavior rather than positively as previously hypothesized. Specifically:

1. Perceived maternal rejection and control correlated negatively with the imaginary audience scale score for males and the total sample.
2. Perceived paternal rejection and control correlated negatively with the imaginary audience scale score for the total sample.
3. Perceived maternal and paternal rejection and control correlated negatively with the transient self score for the total sample.
4. Perceived paternal rejection and control correlated positively only with the abiding self scale for females.
Emotional support was believed to diminish egocentrism in adolescence. Results of this study support that statement. Specifically:

1. Perceived maternal and paternal support correlated negatively with the imaginary audience scale score for the entire sample.
2. Perceived paternal emotional support correlated negatively with the imaginary audience scale score for males and females.
3. Perceived maternal and paternal emotional support correlated negatively with the transient self score for both females and the total sample.
4. Perceived paternal emotional support correlated negatively with the abiding self score for females.

Although physical affect was believed to be negatively correlated with egocentrism, mixed results were revealed. Specifically:

1. Perceived paternal physical affect correlated positively with the imaginary audience scale score for the total sample.
2. Perceived maternal physical affect correlated negatively with the imaginary audience score for males and the total sample.
3. Perceived paternal physical affect correlated positively for the total sample and for females on the transient self score.
4. Perceived maternal physical affect correlated negatively with the transient self score for the entire sample.
5. Perceived paternal physical affect correlated negatively with males for abiding self items.

Withdrawal of attention by both parents was believed to heighten egocentrism. This hypothesis was supported by data from this research.
Specifically:

1. Perceived paternal and maternal withdrawal correlated positively with imaginary audience score for males and the total sample.

2. Perceived paternal withdrawal correlated positively with the imaginary audience score for females.

3. Perceived maternal and paternal withdrawal correlated positively with the transient self score for the total sample.

Parental socialization factors were believed to contribute as much predictive variance as formal operational thought to egocentrism.

Results were as follows:

1. Perceived maternal withdrawal and rejection and control contributed more variance to the imaginary audience scale score than formal operational thought for the total sample.

2. Perceived paternal emotional support contributed more predictive variance to the imaginary audience score than formal operational thought for the total sample.

3. Perceived paternal emotional support contributed more predictive variance to the transient self score than formal operational thought for the total sample.
Elkind (1967, Elkind & Bowen, 1979) proposed that the development of adolescent egocentrism was not possible until the emergence of formal operational thought. Adolescents cannot think that others have opinions about their behavior until the emergence of formal operational thought which allows the adolescent to think hypothetically. No research has tested this relationship to this date. Results of the present study reveal a correlation between formal operational thought and egocentrism. However, it is negative rather than positive as proposed. The higher the level of formal operational thought, the less egocentrism is experienced by the adolescent, particularly in embarrassing situations which are temporary. Several explanations seem plausible. First, an adolescent who is higher in formal operational thought may be more able to discriminate important from nonimportant factors in the environment and be more willing to risk embarrassment. Second, because of formal operations, the adolescent may hold a history of successes in the classroom through superior academic performance. Building upon this pattern of success which contributes to an overall self-esteem, the youth may be more willing to make a mistake or appear silly to others for a brief time. The results of this study raise the point that formal operational thought may lessen rather than increase egocentrism.
No sex differences emerged for level of formal operational thought in this research. Berzonsky (1978) indicated that girls may invest their cognitive development in issues regarding interpersonal development rather than scientific logic. However, Heilbrun (as cited in Hamilton, 1977, p. 85) suggested that females who identify more strongly with fathers than mothers have both expressive and instrumental problem solving behaviors. Denno (1982) in a review of the cognitive differences in males and females indicated that early adolescent females are slightly ahead of males on verbal skills while males are consistently superior in spatial aptitude and visualization skills. It is not known which skills are used most on the modified Classroom Test of Formal Operational Thought. Both are evident. No differences in level of formal operational thought appeared in the results according to sex, but more research is needed to understand why this is true.

Although there are no sex differences in level of formal thought, there are differences in levels of egocentrism. Females score higher on the egocentrism measure. This result is consistent with Elkind and Bowen (1979) and Enright, Shukla and Lapsley (1980). Males evidence lower egocentrism than females, but their egocentrism is influenced more by formal operational thought. For instance, female and male transient self scores are both negatively correlated with formal operational thought. However, the total imaginary audience score for males holds a higher negative correlation with formal operational thought suggesting that aspects of the abiding self are more affected by formal operations for males than they are for females. Goodenough (as cited in Hamilton, 1977, p. 75) indicated that fathers more than mothers differentially reinforce behavior in sons and daughters. Sons are more often rewarded
for correct performance of problem-solving and vocational tasks. Therefore, skills used in formal thought may have more frequently been reinforced by fathers for sons since birth and may be more related to the male adolescent's permanent self concept.

In summary, results of this research suggest that formal operational thought may have the opposite effect on adolescent egocentrism from that proposed by Elkind (1967). Furthermore, the acquisition of formal operational thought appears to be more important to males than females in development of permanent aspects of self-concept. For both males and females, higher formal operational thought contributed to less self-consciousness in momentarily embarrassing situations with peers. More research is needed with a variety of age ranges to provide some information about the developmental trend in formal operational thought and its relationship to egocentrism.

Rejection/Control and Egocentrism

Control as defined by Rollins and Thomas (1979) was subdivided into coercion, induction and love withdrawal. All are efforts by the parent to control the child's behavior. Undifferentiated control attempts by parents have been positively related to the development of self-esteem. However, parental coercion which is a contest of wills had more negative effects on self esteem than induction. Elkind and Bowen (1979) found the Imaginary Audience Scale to be negatively correlated with self-esteem. Based on the Rollins and Thomas (1979) and Elkind and Bowen (1979) studies, a positive correlation was expected in this research. Results of this study did not support that contention. Maternal rejection of sons correlated negatively with male egocentrism.
Only paternal rejection of daughters correlated positively with abiding self egocentrism. These were unlike the results found by Adams and Jones (1982) in which perceived rejection and control for mothers and fathers was associated with heightened egocentrism, particularly in boys.

It is difficult to account for differences between the Adams and Jones (1982) data and the findings of the present study. However, the former had a broader sample, grades 7 through 12. Second, Steinberg and Hill (1978) found interactions among parents and adolescent males changed considerably as the male became older and gained more power in the family structure. Interactions were characterized by more interruptions by parents and fewer explanations. This suggests less induction and more coercion or withdrawal in control technique. Therefore, it appears that use of older adolescents in the sample reflected a change in the way parents and children interacted, therein resulting in increased egocentrism. For this seventh grade sample, parents may still be utilizing more induction than coercion resulting in lower egocentrism.

A second explanation for the differences in the two studies concerns the specific parent behavior evidenced by the more general questionnaire statement. For example, "finds fault with me" may be answered affirmatively by the adolescent, but may be manifested in different ways by the parent. One parent may identify a fault, but ask the youth how he or she could help to change it. This is representative of the induction method. Another parent may "find fault" and show it by expressing a demand for the adolescent to change. This is representative of the coercion method. Each manner of responding has
had different effects on the development of self-esteem and hypothetically, the development of egocentrism. More research is needed to understand which control techniques are utilized by parents.

One further comment about adolescents with controlling parents may be appropriate. These youth may not feel accepted in their behavior at home, and when they are in a situation with peers which may be threatening, they risk more of themselves for the purpose of acting out hostility or for gaining attention of others which might help them to be accepted. Therefore, egocentrism may be diminished by other motives.

Maternal and paternal rejection and control diminished adolescent egocentrism in this study, but cross-sexed parent child relationships were unique. Mothers who rejected and controlled boys had sons with lower egocentrism scores. These data are similar to the research on self esteem presented by Thomas et al. (1974) in which a positive correlation emerged for maternal control and male self-esteem. However, in the latter study, control did not influence self-esteem in females while in the present research, fathers who rejected and controlled daughters had daughters with higher egocentrism scores. It seems plausible that mothers in finding fault may temper their criticism with other supportive remarks like "I'm only telling you this because I love you." Fathers, on the other hand, may more often be authoritarian and expect directions to be followed. Females may be more sensitive to this type of direction which is not as nurturing.

Another piece of evidence in understanding the cross-sexed differences is that two additional items contributed to the rejection/control factor for fathers. Content of these items suggested
that fathers withdraw as a method of control. Daughters appear to be more sensitive to this than sons. Socially, the female may feel that she does not meet the standards of the significant male figure in her life and this contributes to her being less willing to be disclosing to peers in a potentially embarrassing situation.

**Emotional Support and Egocentrism**

Literature on parental support indicated the greater the support, the greater the self-esteem (Hamilton, 1977, Rollins & Thomas, 1979, Thomas et al., 1974). Elkind and Bowen (1979) found the abiding self-aspects of egocentrism to be negatively correlated with measure of self-esteem. One would expect that subsequent research on egocentrism may find parental support also negatively related to abiding self-aspects of imaginary audience behavior. Two studies (Adams & Jones, 1982, Anolik, 1981) have not revealed appreciable contributions to diminished abiding self egocentrism from parental support. Anolik (1981) did find less parental support resulting in more transient self egocentrism. Results of this study are consistent with literature related to the broader egocentrism concept. Emotional support from parents was related to lower egocentrism without exception. When adolescents felt that parents believed in their self worth, adolescents responded with lower imaginary audience scores in both abiding and transient self aspects. Students used in this study differed from the Adams and Jones sample by representing only early adolescents. They differed from the Anolik (1981) group by being nondelinquent. Results of this study may reflect the strong influence of parents in early adolescence. This influence may diminish with age as they become more
receptive to peer influence. Further research is needed to understand if this is a spurious result or one which reflects a trend in diminishing parental influence on egocentrism.

Physical Affect And Egocentrism

Rollins and Thomas (1979) defined the concept of parental support as those behaviors which help a child feel more comfortable with self. The expression of physical affection to early adolescents may or may not serve that function. Physical affection has not been considered as a separate aspect of parental support in much of the previous research and it is therefore difficult to understand how physical affection influences the development of egocentrism.

Adams and Jones (1982) found significant relationships between physical affection and imaginary audience behavior. Maternal physical affect diminished egocentrism in both males and females. Paternal companionship was related to increased egocentrism in boys only. The results of this research support the Adams and Jones (1982) study in part. Maternal expression of affect was clearly related to decreased imaginary audience behavior. The expression of affection by fathers, hugging or kissing goodnight, for example, had mixed effects. It lowered egocentrism related to the permanent aspects of self for males, but appeared to raise hesitancy to reveal the self in temporarily threatening situations for both males and females. The differences between the Adams and Jones (1982) study and this have been referred to in a previous discussion. More research is needed to understand the relationship of paternal physical affect and egocentrism for both genders of children. It seems possible that early adolescents may not
perceive hugging by fathers as something which makes them more comfortable with themselves, and therefore, it does not have the same relationship with imaginary audience behavior as does parental support which thus far has been demonstrated to decrease egocentrism.

**Withdrawal and Egocentrism**

Rollins and Thomas (1979) indicated that children who have more parental support and opportunities for guided choices also learn more about others and demonstrate more social competence. Looft (1972) attributed the ability to decenter to interpersonal interaction. Anolik (1981) had results which were consistent with earlier research. He found delinquents higher in egocentrism and lower in parental support and postulated that parents with delinquents high in egocentrism may not have been available to teach children a sensitivity to others. Adams and Jones (1982) found paternal withdrawal heightened egocentrism in females only. Results of this study are that higher egocentrism in males is associated with maternal and paternal withdrawal. Females' egocentrism is associated with high paternal withdrawal. All research supported a positive correlation between egocentrism and withdrawal with some differences for males and females. These data support a social interaction model where deprivation of parental support contributes to an inability to decenter from one's own point of view.

**Formal Operational Thought and Perceived Parenting Style**

Piaget (Manaster, 1977) believed that cognitive development changed because of maturation, experiences available in the child's
environment, learning sensitivity towards others, and a need to move toward equilibrium when receiving new information. Two of these areas were influenced by parenting style, experiences in the environment and social sensitivity. Previous research has suggested that a child whose father is absent may suffer in development of visualization and spatial orientation skills (Denno, 1982, Lessing, Zagorin & Nelson, 1970). Heilbrun et al. (1965, 1966) discovered a relationship between performance of a cognitive task and parenting style. Others (Bayley, 1965, Medinnus, 1965) have argued that the development of IQ is related to parenting style. Results of this study were consistent with early findings in the area of intelligence, academic achievement and cognitive task. Levels of emotional support and physical affect were important for females. Withdrawal by either parent inhibited male and female development of formal operational thought. Thus, data from this study were consistent with other findings which have been used to build parenting models.

Limitations of the Research

There are five recognizable limitations to the current research. The first concerns the reliability of adolescent responses and how parents may have rated themselves on the same data. Data have been labeled as "perceived" by the adolescent and is not corroborated by data from the parents. How parents may have responded remains unknown. However, previous researchers in the parent-child relationship area lend credibility to data collected from just one source (Brook et al., 1980) note that it is not actual parent behavior, but what is perceived by the child that is important in shaping child behavior.
A second limitation of this study is related to generalizability of results because of the lack of specificity in measures allowing each administration to be somewhat different. This author used a script for production of a videotape based upon instructions given in the original Classroom Test of Formal Operational Thought. No directions were given for the amount of time for each item. "You will use your own judgment about pacing as you progress through the rest of the items."

Furthermore, Lawson indicates that the test presenter may rephrase the questions or part of the question as long as no items of information which might give hints about the correct solution are included. This leaves considerable leeway for variation in the instrument from presentation to presentation. This author attempted to correct for some lack of standardization by providing a script with directions and time limitations for each task (Appendix G). In addition, there was no way to account for interactions between the presenter and class members or among class members themselves which helped to shape attitudes about the way the task was approached. This researcher addressed that limitation by administering the instrument in eleven different settings.

A further limitation regarding generalizability of this research to the general population is the unique quality of the sample. It was noted that the majority of the fathers held jobs with a status similar to farm foremen while mothers held positions with status relative to seamstress. Less than one percent lived in a town over five thousand people, a rural environment. It was difficult to say how adolescent egocentrism, perceived parenting style and formal operational thought may be related in a sample having different characteristics.
A major limitation is reliance upon rating scales for data. Egocentrism and perceived parenting styles. Although from this study indicates reliability and validity for these with this sample and is consistent with other research. The rating scale items have no specific behavior reference. e, what does a parent do "who over the past several years trust me in my role as a family member"?

A final limitation of this research has plagued other parent-child Rollins & Thomas, 1979). The data collected were unidimen-
only considering the quality of the parent rather than the of the adolescent or the effect of the interaction between and adolescent.
The following conclusions are warranted in light of the results and limitations of the study:

1. There appears to be a relationship between formal operational thought and egocentrism which is negative rather than positive. Higher levels of formal operations correlate with less transient self egocentrism. Females and males may not differ in ability to do formal operations, but females continue to score higher consistently on measures of egocentrism.

2. There is also a relationship between perceived parenting styles and adolescent egocentrism, but results are mixed. Some qualities of parenting which are regarded as beneficial, may actually contribute to adolescent egocentrism. For example, perceived paternal physical affection increases transient self egocentrism for both males and females. Maternal rejection and control lowers egocentrism in males, while paternal rejection and control increase egocentrism for females. Males and females do not react similarly to the same perceived parent quality and cross-sexed relationships are unique.

3. Although formal operational thought and perceived parenting styles both contribute to adolescent egocentrism, other factors which have not yet been identified contribute a significant amount. Beta weights ranged from -.04 to -.33 which accounts for a small, but significant amount of variance.
Maternal emotional support appears to be the strongest equal correlate with egocentrism. Other factors not yet explored are onset of puberty, influence of perceived peer relationships and onset of dating behavior may account for, as yet, unexplained variance.

Implications for Further Research

In light of the conclusions, further research is warranted in several areas:

1. As suggested by Berzonsky (1978) and Mosher (1979) formal operational thought may be more comprehensive than the scientific logic model proposed by Piaget which utilizes experimental tasks. Other measures of formal operational thought need to be developed such as a measure of aesthetic or linguistic development. If indeed females utilize their cognitive skills in interpersonal matters, how might this be measured? It seems plausible that these aspects of cognitive development may also impact adolescent egocentrism.

2. Looft (1972) proposed that egocentrism is most strongly affected by interpersonal interaction. Although this research provides one measure of interaction with the family, the importance of peer contacts has yet to be explored.

3. Because the Elkind and Bowen (1979) instrument only measures the construct of imaginary audience behavior for
egocentrism, it is not known how formal operational thought and perceived parenting styles may impact other areas of egocentrism such as personal fable and self focus.

4. Previous authors (Adams & Jones, 1982, Elkind & Bowen, 1979, Enright, Lapsley & Shukla, 1979; Enright, Shukla & Lapsley, 1980) utilized a broad age range of subjects and indicated changes in adolescent egocentrism with age. Younger adolescents had increased levels of egocentrism. Further research is needed to understand how formal operational thought and perceived parenting styles contribute to changes in egocentrism from a developmental perspective.

5. Causes which may contribute to egocentrism need to be further explored, i.e., onset of puberty, the beginning of dating behavior.

6. Several variables from the literature are believed to covary with formal operational thought, specifically intelligence and socioeconomic class. Additional research is needed to clarify the effect on formal operational thought from these variables as it effects egocentrism.
REFERENCES


Appendix A

Abiding and Transient Self Items
ABIDING SELF ITEMS

2. Let's say some adult visitors came to your school and you were asked to tell them a little bit about yourself.
   ___ I would like that.
   ___ I would not like that.
   ___ I wouldn't care.

4. If you went to a party where you did not know most of the kids, would you wonder what they were thinking about you?
   ___ I wouldn't think about it.
   ___ I would wonder about that a lot.
   ___ I would wonder about that a little.

6. When someone watches me work...
   ___ I get very nervous.
   ___ I don't mind at all.
   ___ I get a little nervous.

8. One young person said, "When I'm with people I get nervous because I worry about how much they like me."
   ___ I feel like this often.
   ___ I never feel like this.
   ___ I feel like this sometimes.

11. Let's say you wrote a story for an assignment your teacher gave you, and she asked you to read it aloud to the rest of the class.
    ___ I would not like that at all.
    ___ I would like that but I would be nervous.
    ___ I would like that.

12. If you were asked to get up in front of the class and talk a little bit about your hobby...
    ___ I wouldn't be nervous at all.
    ___ I would be a little nervous.
    ___ I would be very nervous.
TRANSIENT SELF ITEMS

1. You have looked forward to the most exciting dress up party of the year. You arrive after an hour's drive from home. Just as the party is beginning, you notice a grease spot on your trousers or skirt. (There is no way to borrow clothes from anyone.) Would you stay or go home?
   - Go home.
   - Stay, even though I'd feel uncomfortable.
   - Stay, because the grease spot wouldn't bother me.

3. It is Friday afternoon and you have just had your hair cut in preparation for the wedding of a relative that weekend. The barber or hairdresser did a terrible job and your hair looks awful. To make it worse, that night is the most important basketball game of the season and you really want to see it, but there is no way you can keep your head covered without people asking questions. Would you stay home or go to the game anyway?
   - Go to the game and not worry about my hair.
   - Go to the game and sit where people won't notice me much.
   - Stay home.

5. You are sitting in class and have discovered that your jeans have a small but noticeable split along the side seam. Your teacher has offered extra credit toward his/her course grade to anyone who can write the correct answer to a question on the blackboard. Would you get up in front of the class and go to the blackboard, or would you remain seated?
   - Go to the blackboard as though nothing had happened.
   - Go to the blackboard and try to hide the split.
   - Remain seated.

7. Your class is supposed to have their pictures taken, but you fell the day before and scraped your face. You would like to be in the picture but your cheek is red and swollen. Would you have your picture taken anyway or stay out of the picture?
   - Get your picture taken even though you'd be embarrassed.
   - Stay out of the picture.
   - Get your picture taken and not worry about it.

9. You have been looking forward to your friend's party for weeks, but just before you leave for the party your mother tells you that she accidentally washed all your good clothes with a red shirt. Now
all your jeans are pink in spots. The only thing left to wear are your jeans that are too big and too baggy. Would you go to the party or would you stay home?

___ Go to the party, but buy a new pair of jeans to wear.
___ Stay home
___ Go to the party in either the pink or baggy jeans.

10. Suppose you went to a party that you thought was a costume party but when you got there you were the only person wearing a costume. You'd like to stay and have fun with your friends, but your costume is very noticeable. Would you stay or go home?

___ Go home.
___ Stay and have fun joking about your costume.
___ Stay, but try to borrow some clothes to wear.
Appendix B

Student Answer Booklet
Information Sheet

Please complete the following information about yourself and your family. You will not be identified by name.

1. Sex: Female ____
   Male ____
2. Birthdate: ______________________
3. Father's Occupation ______________________
   Mother's Occupation ______________________
4. Where do you live?
   ____ Farm whose income supports family, family-owned.
   ____ Farm where parents are employed by a larger organization.
   ____ Home in country, but parents are employed elsewhere.
   ____ Small town, under 2,000 people.
   ____ Large town, 2,000 - 5,000 people.
   ____ City, above 5,000.
PERCEPTIONS OF PARENTS

Directions: Each student is asked to read the following statements and indicate how their parents are viewed. Circle the answer which best describes the behavior of father (left side) and mother (right side).

1. Father Over the past several years this parent seemed to trust me in my role as a family member.
   
   1. Never
   2. Hardly Ever
   3. Sometimes
   4. Fairly Often
   5. Very Often

2. Father Over the past several years whenever I had any kind of problem I could count on this parent to help me out.
   
   1. Never
   2. Hardly Ever
   3. Sometimes
   4. Fairly Often
   5. Very Often

3. Father Over the past several years this parent felt affection for me and I was certain of it.
   
   1. Never
   2. Hardly Ever
   3. Sometimes
   4. Fairly Often
   5. Very Often
4. **Father** Over the past several years this parent has shown positive interest in and support of me in my daily affairs as part of the family.

5. **Father** Over the past several years I experienced a feeling of security in my relationship with this parent.

6. **Father** Over the past several years this parent seemed to approve of me and the things I did.

7. **Father** Over the past several years this parent expressed physical affection.

---

**Mother**

5. ..........................Very Often..................................5
4. ..........................Fairly Often.................................4
3. ..........................Sometimes....................................3
2. ..........................Hardly Ever..................................2
1. ..........................Never..........................................1

5. ..........................Very Often..................................5
4. ..........................Fairly Often.................................4
3. ..........................Sometimes....................................3
2. ..........................Hardly Ever..................................2
1. ..........................Never..........................................1

5. ..........................Very Often..................................5
4. ..........................Fairly Often.................................4
3. ..........................Sometimes....................................3
2. ..........................Hardly Ever..................................2
1. ..........................Never..........................................1

5. ..........................Very Often..................................5
4. ..........................Fairly Often.................................4
3. ..........................Sometimes....................................3
2. ..........................Hardly Ever..................................2
1. ..........................Never..........................................1

5. ..........................Very Often..................................5
4. ..........................Fairly Often.................................4
3. ..........................Sometimes....................................3
2. ..........................Hardly Ever..................................2
1. ..........................Never..........................................1
Circle one of the three answers on the left which best describes how your father treats you. Then circle one of the three answers on the right side of the page which best describes how your mother treats you.

<table>
<thead>
<tr>
<th>Father</th>
<th>This parent....</th>
<th>Mother</th>
</tr>
</thead>
<tbody>
<tr>
<td>NL</td>
<td>SL L</td>
<td>NL</td>
</tr>
<tr>
<td></td>
<td>&quot;...sometimes, when disapproving of what I had done, he/she did not say anything but was cold and distant for awhile.&quot;</td>
<td>SL L</td>
</tr>
<tr>
<td>NL</td>
<td>SL L</td>
<td>NL</td>
</tr>
<tr>
<td></td>
<td>&quot;...told me how much he/she loved me.&quot;</td>
<td>SL L</td>
</tr>
<tr>
<td>NL</td>
<td>SL L</td>
<td>NL</td>
</tr>
<tr>
<td></td>
<td>&quot;...enjoyed going on drives, trips, or visits with me.&quot;</td>
<td>SL L</td>
</tr>
<tr>
<td>NL</td>
<td>SL L</td>
<td>NL</td>
</tr>
<tr>
<td></td>
<td>&quot;...hugged and kissed me often.&quot;</td>
<td>SL L</td>
</tr>
<tr>
<td>NL</td>
<td>SL L</td>
<td>NL</td>
</tr>
<tr>
<td></td>
<td>&quot;...hugged and kissed me good-night.&quot;</td>
<td>SL L</td>
</tr>
<tr>
<td>NL</td>
<td>SL L</td>
<td>NL</td>
</tr>
<tr>
<td></td>
<td>&quot;...believed in showing his/her love for me.&quot;</td>
<td>SL L</td>
</tr>
<tr>
<td>NL</td>
<td>SL L</td>
<td>NL</td>
</tr>
<tr>
<td></td>
<td>&quot;...would not talk to me when I displeased him/her.&quot;</td>
<td>SL L</td>
</tr>
<tr>
<td>NL</td>
<td>SL L</td>
<td>NL</td>
</tr>
<tr>
<td></td>
<td>&quot;...avoided looking at me when I disappointed him/her.&quot;</td>
<td>SL L</td>
</tr>
<tr>
<td>NL</td>
<td>SL L</td>
<td>NL</td>
</tr>
<tr>
<td></td>
<td>&quot;...was always finding fault with me.&quot;</td>
<td>SL L</td>
</tr>
<tr>
<td>NL</td>
<td>SL L</td>
<td>NL</td>
</tr>
<tr>
<td></td>
<td>&quot;...was always telling me how to behave.&quot;</td>
<td>SL L</td>
</tr>
<tr>
<td>NL</td>
<td>SL L</td>
<td>NL</td>
</tr>
<tr>
<td></td>
<td>&quot;...often complained about what I did.&quot;</td>
<td>SL L</td>
</tr>
<tr>
<td>NL</td>
<td>SL L</td>
<td>NL</td>
</tr>
<tr>
<td></td>
<td>&quot;...was always trying to change me.&quot;</td>
<td>SL L</td>
</tr>
<tr>
<td>NL</td>
<td>SL L</td>
<td>NL</td>
</tr>
<tr>
<td></td>
<td>&quot;...was always getting after me.&quot;</td>
<td>SL L</td>
</tr>
</tbody>
</table>
stopped talking to me if I hurt his/her feelings.

won't have anything to do with me when I upset him/her until I made up.

liked to talk to me and be with me much of the time.
IMAGINARY AUDIENCE SCALE

Instructions: Please read the following stories carefully while they are read aloud and assume that the events actually happened to you. Place a check next to the answer that best describes what you would do or feel in the real situation.

1. You have looked forward to the most exciting dress up party of the year. You arrive after an hour's drive from home. Just as the party is beginning, you notice a grease spot on your trousers or skirt. (There is no way to borrow clothes from anyone.) Would you stay or go home?

___ Go home.
___ Stay, even though I'd feel uncomfortable.
___ Stay, because the grease spot wouldn't bother me.

2. Let's say some adult visitors came to your school and you were asked to tell them a little bit about yourself.

___ I would like that.
___ I would not like that.
___ I wouldn't care.

3. It is Friday afternoon and you have just had your hair cut in preparation for the wedding of a relative that weekend. The barber or hairdresser did a terrible job and your hair looks awful. To make it worse, that night is the most important basketball game of the season and you really want to see it, but there is no way you can keep your head covered without people asking questions. Would you stay home or go to the game anyway?

___ Go to the game and not worry about my hair.
___ Go to the game and sit where people won't notice me much.
___ Stay home.

4. If you went to a party where you did not know most of the kids, would you wonder what they were thinking of you?

___ I wouldn't think of it.
___ I would wonder about that a lot.
___ I would wonder about that a little.
5. You are sitting in class and have discovered that your jeans have a small but noticeable split along the side seam. Your teacher has offered extra credit toward his/her course grade to anyone who can write the correct answer to a question on the blackboard. Would you get up in front of the class and go to the blackboard, or would you remain seated?

___ Go to the blackboard as though nothing had happened.
___ Go to the blackboard and try to hide the split.
___ Remain seated.

6. When someone watches me work....

___ I get very nervous.
___ I don't mind at all.
___ I get a little nervous.

7. Your class is supposed to have their pictures taken, but you fall the day before and scraped your face. You would like to be in the picture but your cheek is red and swollen. Would you have your picture taken anyway or stay out of the picture?

___ Get your picture taken even though you'd be embarrassed.
___ Stay out of the picture.
___ Get your picture taken and not worry about it.

8. One young person said, "When I'm with people I get nervous because I worry about how much they like me."

___ I feel like this often.
___ I never feel like this.
___ I feel like this sometimes.

9. You have been looking forward to your friend's party for week, but just before you leave for the party your mother tells you that she accidentally washed all your good clothes with a red shirt. Now all your jeans are pink in spots. The only thing left to wear are your jeans that are too big and too baggy. Would you go to the party or would you stay home?

___ Go to the party, but buy a pair of new jeans to wear.
___ Stay home.
___ Go to the party in either the pink or baggy jeans.
10. Suppose you went to a party that you thought was a costume party but when you got there you were the only person wearing a costume. You'd like to stay and have fun with your friends, but your costume is very noticeable. Would you stay or go home?
   ___ Go home.
   ___ Stay and have fun joking about your costume.
   ___ Stay, but try to borrow some clothes to wear.

11. Let's say you wrote a story for an assignment your teacher gave you, and she asked you to read it aloud to the rest of the class.
   ___ I would not like that at all.
   ___ I would like that but I would be nervous.
   ___ I would like that.

12. If you were asked to get up in front of the class and talk a little bit about your hobby....
   ___ I wouldn't be nervous at all.
   ___ I would be a little nervous.
   ___ I would be very nervous.
Directions

For each of the items below, a situation will be demonstrated. Each demonstration will lead to a question or questions for which there are a number of possible answers. For each item you are to check the box of the best answer and explain your choice in the space provided.

Example Item: "The Balancing Beam"

☐ Mark 3
☐ Mark 7
☐ Mark 8
☐ Mark 10

Please explain your choice.

Item 1: "Pieces of Clay"

☐ The pancake weighs more.
☐ The pieces weigh the same.
☐ The ball weighs more.

Please explain your choice.

Item 2: "Metal Weights"

☐ The water will rise to a higher level.
☐ The water will rise to a lower level.
☐ The water will rise to the same level.

Please explain your choice.
Item 3: "The Pendulum Length"
Which pendulum or pendulums would you use for the experiment?
- [ ] 1 and 2
- [ ] 1 and 3
- [ ] 2 and 3
- [ ] 1, 2, and 3
- [ ] 2 only
Please explain your choice.

Item 4: "The Pendulum's Weight"
Which pendulum or pendulums would you use for the experiment?
- [ ] 1 and 2
- [ ] 1 and 3
- [ ] 2 and 3
- [ ] 1, 2, and 3
- [ ] 3 only
Please explain your choice.
Item 5: "The Balancing Beam 1"

Where would you hang the 5-unit weight to make the beam balance?

☐ Between Mark 3 and 4
☐ Mark 7
☐ Mark 12
☐ Mark 14
☐ At the end

Please explain your choice.

Item 6: "The Balancing Beam 2"

Where would you hang the 10-unit weight to make the beam balance?

☐ Mark 5
☐ Mark 6
☐ Between Mark 6 and 7
☐ Mark 7

☐ Mark 8
☐ Mark 9
☐ Mark 10
☐ Mark 17

Please explain your choice.
Item 7: "The Metal Box"

The objective of this puzzle is to discover which switch or switches must be flipped to make the light turn on.

Example:

<table>
<thead>
<tr>
<th>ON</th>
<th>OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Your Record:

1. ______________ 11. ______________ 21. ______________
2. ______________ 12. ______________ 22. ______________
3. ______________ 13. ______________ 23. ______________
4. ______________ 14. ______________ 24. ______________
5. ______________ 15. ______________ 25. ______________
6. ______________ 16. ______________ 26. ______________
7. ______________ 17. ______________ 27. ______________
8. ______________ 18. ______________ 28. ______________
9. ______________ 19. ______________ 29. ______________
10. _____________ 20. _____________ 30. ____________

- y - yellow switch
- b - blue switch
- r - red switch
- g - green switch
Item 8: "The Shopping Center"

In a new SHOPPING CENTER, 4 store locations are going to be opened on the ground level.

A BARBER SHOP, a DISCOUNT STORE, a GROCERY STORE, and a RESTAURANT want to move in there. Each one of the stores can choose any one of the 4 locations. Write ALL THE POSSIBLE WAYS that the stores can occupy the 4 locations. Write on the lines below the letter B for BARBER SHOP, the letter D for DISCOUNT STORE, the letter G for GROCERY STORE, and the letter R for RESTAURANT.

BDGC

__________  __________  __________  __________  __________

__________  __________  __________  __________  __________

__________  __________  __________  __________  __________

__________  __________  __________  __________  __________

__________  __________  __________  __________  __________

__________  __________  __________  __________  __________

__________  __________  __________  __________  __________

__________  __________  __________  __________  __________

__________  __________  __________  __________  __________

__________  __________  __________  __________  __________

__________  __________  __________  __________  __________

__________  __________  __________  __________  __________
Item 9: "The Squares"

Three yellow squares and three red squares are put into a sack. What are the chances of pulling out a red square on the first try?

- 1 out of 1
- 1 out of 2
- 1 out of 3
- 1 out of 6
- 2 out of 6
- 4 out of 6
- 3 out of 3
- other

Please explain your choice.

Item 10: "Squares and Diamonds"

Three red squares, four yellow squares, and five blue squares are put into a sack. Four red diamonds, two yellow diamonds, and three blue diamonds are put into the same sack. What are the chances of pulling out a red piece on the first try?

- 1 out of 1
- 1 out of 2
- 1 out of 3
- 1 out of 4
- 1 out of 21
- 7 out of 21
- 1 out of 7
- other

Please explain your choice.
Appendix C

Heilbrun-Schaefer Parent Perception Questionnaire
PERCEPTIONS OF PARENTS

Directions: Each student is asked to read the following statements and indicate how their parents are viewed. Circle the answer which best describes the behavior of father (left side) and mother (right side).

1. Father Over the past several years this parent seemed to trust me in my role as a family member.
   1. Never
   2. Hardly Ever
   3. Sometimes
   4. Fairly Often
   5. Very Often

2. Father Over the past several years whenever I had any kind of problem I could count on this parent to help me out.
   1. Never
   2. Hardly Ever
   3. Sometimes
   4. Fairly Often
   5. Very Often

3. Father Over the past several years this parent felt affection for me and I was certain of it.
   1. Never
   2. Hardly Ever
   3. Sometimes
   4. Fairly Often
   5. Very Often
4. **Father**  
Over the past several years this parent has shown positive interest in and support of me in my daily affairs as part of the family.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Often</td>
<td>5</td>
</tr>
<tr>
<td>Fairly Often</td>
<td>4</td>
</tr>
<tr>
<td>Sometimes</td>
<td>3</td>
</tr>
<tr>
<td>Hardly Ever</td>
<td>2</td>
</tr>
<tr>
<td>Never</td>
<td>1</td>
</tr>
</tbody>
</table>

5. **Father**  
Over the past several years I experienced a feeling of security in my relationship with this parent.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>1</td>
</tr>
<tr>
<td>Hardly Ever</td>
<td>2</td>
</tr>
<tr>
<td>Sometimes</td>
<td>3</td>
</tr>
<tr>
<td>Fairly Often</td>
<td>4</td>
</tr>
<tr>
<td>Very Often</td>
<td>5</td>
</tr>
</tbody>
</table>

6. **Father**  
Over the past several years this parent seemed to approve of me and things I did.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>1</td>
</tr>
<tr>
<td>Hardly Ever</td>
<td>2</td>
</tr>
<tr>
<td>Sometimes</td>
<td>3</td>
</tr>
<tr>
<td>Fairly Often</td>
<td>4</td>
</tr>
<tr>
<td>Very Often</td>
<td>5</td>
</tr>
</tbody>
</table>

7. **Father**  
Over the past several years this parent expressed physical affection.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>1</td>
</tr>
<tr>
<td>Hardly Ever</td>
<td>2</td>
</tr>
<tr>
<td>Sometimes</td>
<td>3</td>
</tr>
<tr>
<td>Fairly Often</td>
<td>4</td>
</tr>
<tr>
<td>Very Often</td>
<td>5</td>
</tr>
</tbody>
</table>
Circle one of the three answers on the left which best describes how your father treats you. Then circle one of the three answers on the right side of the page which best describes how your mother treats you.

<table>
<thead>
<tr>
<th>Father</th>
<th>This parent....</th>
<th>Mother</th>
</tr>
</thead>
<tbody>
<tr>
<td>NL</td>
<td>SL</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>___sometimes, when disapproving of what I had done, he/she did not say anything but was cold and distant for awhile.</td>
<td>NL</td>
</tr>
<tr>
<td>NL</td>
<td>SL</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>___told me how much he/she loved me.</td>
<td>NL</td>
</tr>
<tr>
<td>NL</td>
<td>SL</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>___enjoyed going on drives, trips, or visits with me.</td>
<td>NL</td>
</tr>
<tr>
<td>NL</td>
<td>SL</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>___hugged and kissed me often.</td>
<td>NL</td>
</tr>
<tr>
<td>NL</td>
<td>SL</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>___hugged and kissed me good-night.</td>
<td>NL</td>
</tr>
<tr>
<td>NL</td>
<td>SL</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>___believed in showing his/her love for me.</td>
<td>NL</td>
</tr>
<tr>
<td>NL</td>
<td>SL</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>___would not talk to me when I displeased him/her.</td>
<td>NL</td>
</tr>
<tr>
<td>NL</td>
<td>SL</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>___avoided looking at me when I disappointed him/her.</td>
<td>NL</td>
</tr>
<tr>
<td>NL</td>
<td>SL</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>___was always finding fault with me.</td>
<td>NL</td>
</tr>
<tr>
<td>NL</td>
<td>SL</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>___was always telling me how to behave.</td>
<td>NL</td>
</tr>
<tr>
<td>NL</td>
<td>SL</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>___often complained about what I did.</td>
<td>NL</td>
</tr>
<tr>
<td>NL</td>
<td>SL</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>___was always trying to change me.</td>
<td>NL</td>
</tr>
<tr>
<td>NL</td>
<td>SL</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>___was always getting after me.</td>
<td>NL</td>
</tr>
<tr>
<td>NL</td>
<td>SL</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>___stopped talking to me if I hurt his/her feelings.</td>
<td>NL</td>
</tr>
<tr>
<td>NL</td>
<td>SL</td>
<td>L</td>
</tr>
<tr>
<td>NL</td>
<td>SL</td>
<td>L</td>
</tr>
</tbody>
</table>
Appendix D

Imaginary Audience Scale
IMAGINARY AUDIENCE SCALE

Instructions: Please read the following stories carefully and assume that the events actually happened to you. Place a check next to the answer that best describes what you would do or feel in the real situation.

1. You have looked forward to the most exciting dress up party of the year. You arrive after an hour's drive from home. Just as the party is beginning, you notice a grease spot on your trousers or skirt. (There is no way to borrow clothes from anyone.) Would you stay or go home?
   - Go home.
   - Stay, even though I'd feel uncomfortable.
   - Stay, because the grease spot wouldn't bother me.

2. Let's say some adult visitors came to your school and you were asked to tell them a little bit about yourself.
   - I would like that.
   - I would not like that.
   - I wouldn't care.

3. It is Friday afternoon and you have just had your hair cut in preparation for the wedding of a relative that weekend. The barber or hairdresser did a terrible job and your hair looks awful. To make it worse, that night is the most important basketball game of the season and you really want to see it, but there is no way you can keep your head covered without people asking questions. Would you stay home or go to the game anyway?
   - Go to the game and not worry about my hair.
   - Go to the game and sit where people won't notice me much.
   - Stay home.

4. If you went to a party where you did not know most of the kids, would you wonder what they were thinking about you?
   - I wouldn't think about it.
   - I would wonder about that a lot.
   - I would wonder about that a little.

5. You are sitting in class and have discovered that your jeans have a small but noticeable split along the side seam. Your teacher has
offered extra credit toward his/her course grade to anyone who can write the correct answer to a question on the blackboard. Would you get up in front of the class and go to the blackboard, or would you remain seated?

- Go to the blackboard as though nothing had happened.
- Go to the blackboard and try to hide the split.
- Remain seated.

6. When someone watches me work...

- I get very nervous.
- I don't mind at all
- I get a little nervous.

7. Your class is supposed to have their pictures taken, but you fell the day before and scraped your face. You would like to be in the picture but your cheek is red and swollen. Would you have your picture taken anyway or stay out of the picture?

- Get your picture taken even though you'd be embarrassed.
- Stay out of the picture.
- Get your picture taken and not worry about it.

8. One young person said, "When I'm with people I get nervous because I worry about how much they like me."

- I feel like this often.
- I never feel like this.
- I feel like this sometimes.

9. You have been looking forward to your friend's party for weeks, but just before you leave for the party your mother tells you that she accidentally washed all your good clothes with a red shirt. Now all your jeans are pink in spots. The only thing left to wear are your jeans that are too big and too baggy. Would you go to the party or would you stay home?

- Go to the party, but buy a new pair of jeans to wear.
- Stay home
- Go to the party in either the pink or baggy jeans.

10. Suppose you went to a party that you thought was a costume party but when you got there you were the only person wearing a costume. You'd like to stay and have fun with your friends, but your costume is very noticeable. Would you stay or go home?

- Go home.
- Stay and have fun joking about your costume.
- Stay, but try to borrow some clothes to wear.
11. Let's say you wrote a story for an assignment your teacher gave you, and she asked you to read it aloud to the rest of the class.

_____ I would not like that at all.
_____ I would like that but I would be nervous.
_____ I would like that.

12. If you were asked to get up in front of the class and talk a little bit about your hobby...

_____ I wouldn't be nervous at all.
_____ I would be a little nervous.
_____ I would be very nervous.
Appendix E

Modified Classroom Test of Formal Thought
MODIFIED VERSION

CLASSROOM TEST OF FORMAL OPERATIONS: TESTING AND SCORING PROCEDURES AND ANSWER KEY

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DEPARTMENT OF PHYSICS
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TEMPE, ARIZONA 85281

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Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the author and do not necessarily reflect the views of the National Science Foundation.
Introduction

The original fifteen-item test was developed and validated by Anton Lawson, *Journal of Research in Science Teaching, 15*(1), 11-24, 1978. Administration of the test requires apparatus like that described in the instructions. Details of the apparatus are not critical, however, because it is never used by the subjects but merely serves to illustrate the questions. Procedures for each test item are described below and are followed immediately by the material to be included in the students' answer booklets. Also given is the answer key. The item titles and spaces for answers and explanations should be assembled into booklets of one or two items per page, but omitting the answer key, of course. "Example" will be done by the class as a whole to introduce the students to the test procedure and the somewhat unusual form of the responses required.
I. GENERAL TESTING PROCEDURES

1. Students should be seated with empty seats between them if possible.

2. Pass out one test booklet to each student.

3. Provide the students with a general introduction to the test by explaining that the test consists of a number of demonstration items that lead to problems.

4. Have the students fill in the information on the top right-hand corner of the test booklet and then read the directions.

5. Explain that they will be progressing through the items as a class. This means that some students may finish some items before others and will have to be patient until all (or nearly all) of the other students have finished before going on to the next item.

6. Do the Example Item, "The Balancing Beam" with the class (see directions below). Have one student volunteer his answer and his explanation. Explain to the class that their explanations need not be lengthy but they should be complete. In this case, a complete explanation would be: "The weights are the same so the lengths should also be the same." Give the students time to write down their explanations and proceed to Item 1.

7. After demonstrating Item 1, give the students time to select an answer and justify their selection. Proceed to Item 2 when all but a few students have completed Item 1. You will have to use your own judgment about pacing as you progress through the rest of the items. You must go quickly enough so that the fast students do not become too impatient but you must go slowly enough so that the slower students have ample opportunity to respond. The entire test normally takes 50 to 60 minutes of class time in one long session or two shorter sessions.

8. It is important that the students understand the situations and the questions as best as they can. For this reason, you may need to repeat or rephrase certain questions and items of information for certain students. This is proper but care must be taken not to provide hints as to the correct solution.
II. SPECIFIC TESTING PROCEDURES FOR EACH ITEM

Example: "The Balancing Beam"

Materials: 1 balance beam
           1 10-unit hanging weights

Directions: Show the students the balance beam and the two 10-unit hanging weights. Point out the equally spaced marks along the length of the beam and how the beam balances like a teeter totter when no weights are hung on it. Hang a 10-unit weight on one side of the beam at the 7th mark.

Ask: Where should the other 10-unit weight be hung to make the beam balance?

Item 1: "Pieces of Clay"

Materials: 2 balls of clay of equal size, shape and weight
           1 balance beam
           2 balance pans

Directions: Show the students the two balls of clay. Point out that they are the same size and shape. Demonstrate that they weigh the same by placing them in the balance pans hung equal distances from the fulcrum of the balance beam. Remove the balls of clay from the pans and flatten one of them into a "pancake shape".

Ask: Does the pancake shape piece weigh more now? Do the two pieces weigh the same? or Does the ball weigh more?

Item 2: "Metal Weights"

Materials: 2 metal weights of equal volume but different weight (18 and 55 grams).
           2 25-ml graduated cylinders partially filled with colored water
           1 balance beam
           2 balance pans

Directions: Show the students the metal weights. Point out that they are equal in height and in thickness. Place them on the pans of the balance beam to demonstrate their unequal weights. Point out the cylinders filled with equal amounts of colored water. Slowly lower the weight into one of the cylinders. Note the rise in water level.
Ask: If the heavier weight were lowered into the other cylinder, would the water level rise higher, the same, or lower than it did in the cylinder with the light weight?

Item 3: "The Pendulum's Length"

Materials: 3 strings numbered 1, 2, 3 suspended from a single support. Strings #1 and #3 are of equal length, string #2 is longer. 2 5-unit weights hung at the end of strings #2 and #3. 1 10-unit weight hung at the end of string #1.

Directions: Show the students the three strings and the weights. Attach the weights to the proper strings and explain that this makes three pendulums (just three strings with weights attached to their ends). Point out that pendulum #1 and #3 are the same length while pendulum #2 is longer. Point out that pendulum #2 and #3 have the same weight, but that pendulum #1 has a heavier weight. Swing one of the pendulums and count out loud each time the weight swings back to the release point. Point out that the pendulum seems to take about one second per swing.

Ask: Suppose you wanted to do an experiment to find out if changing the length of a pendulum changed the amount of time it takes to swing back and forth. Which pendulum or pendulums would you use for the experiment?

Item 4: "The Pendulum's Weight"

Materials: Same as for Item 5.

Ask: Suppose you wanted to do an experiment to find out if changing the weight on the end of the string changed the amount of time the pendulum takes to swing back and forth. Which pendulum or pendulums would you use for the experiment?

Item 5: "The Balancing Beam 1"

Materials: 1 balance beam 1 10-unit hanging weight 1 5-unit hanging weight
Directions: Show the students the balance beam and the two hanging weights. Hang the 15-unit weight 4 marks out from the fulcrum on one side of the beam. Point out that the 15-unit weight is hanging at 4 marks from the center.

Ask: Where would you hang the 10-unit weight to make the beam balance?

Item 7: "The Metal Box"

Materials: 1 metal box with four switches, a black button, and a light bulb on it.

Directions: Point out the box, the switches, the light bulb and the black button. Point out that the switches are identified by four colors so that there is a "yellow switch", a "blue switch", a "red switch", and a "green switch". The switches can be flipped into either an "up position" or a "down position". If the correct switch or switches are flipped into the up position, and the black button is pushed, the bulb will light.

Cover the switches and flip the blue and green switches into the up position. Push the button to show the students that the bulb will, in fact, light if the correct switch or switches are flipped. You may need to flip other switches up and down again to assure that the students are not clued as the correct combination. Flip all switches back to the down position and uncover them.

Explain that the objective of this puzzle is to discover which switch or switches must be flipped to make the light turn on. To do this they would actually need to use the box, but since there is only one box, they can only indicate how they would go about flipping switches to find out.

Show them how to use the symbols, y, b, r, g, and the spaces labeled "Your Record" on their booklets by doing the example. Flip switch y (the yellow switch), push the black button, and note that the light remains off.

Explain that on each try the order in which the switches are flipped does not matter. For instance y,r and r,y are the same trial so they should not write down both.
Item 8: "The Shopping Center"

Materials: 4 pictures of stores - a Barber Shop (B)  
           a Discount Store (D)  
           a Grocery Store (G)  
           a Coffee Shop (C)

Directions: Read the problem out loud. Show the students the four stores. Arrange them in the following way -- B D G C. Show them that this order corresponds to that indicated on the first line in the booklet. This means that the Barber Shop is in the first store location on the left, the Discount Store is in the second store location, and the Grocery Store is in the third store location, and the Coffee Shop is in the fourth store location on the right.

Ask: Now write all other possible ways that the stores could be arranged, one arrangement per line. Note that there are extra lines in your booklet.

Item 9: "The Squares"

Materials: 1 cloth sack  
           3 yellow wooden squares  
           3 red wooden squares

Directions: Show the students the sack and the 3 yellow and 3 red wooden squares. Point out that each square is identical in size and shape. Place all the squares into the sack. Shake them up. Reach into the sack and select one piece (the first that you touch). Have the students imagine that you are going to pull this piece out of the sack.

Ask: What are the chances of pulling out a red square on the first try?

Item 10: "Squares and Diamonds"

Materials: 1 cloth sack  
           3 red wooden squares  
           4 yellow wooden squares  
           5 blue wooden squares  
           4 red wooden diamonds  
           2 yellow wooden diamonds  
           3 blue wooden diamonds
Directions: Show the students the cloth sack and the square and diamond shaped pieces. Point out that all of the square shaped pieces are identical in size and shape as are the diamond shaped pieces. Place all of the pieces into the sack. Shake them up. Reach into the sack and select one piece (the first that you touch). Have the students imagine that you are going to pull this piece out of the sack.

Ask: What are the chances of pulling out a red piece on the first try?

III. Scoring Procedures

1. Each item is scored either correct or incorrect. Total test scores, therefore, may range from 0 to 10. Scores of 0-3 reflect concrete operational performance on the test. Scores of 4-7 reflect transitional performance and scores of 8-10 reflect formal operational performance.

2. To grade each item, compare the student answers and explanations to those shown on the ANSWER KEY. An item is correct only if the correct box is checked and an adequate explanation if provided.
Directions

For each of the items below, a situation will be demonstrated. Each demonstration will lead to a question or questions for which there are a number of possible answers. For each item you are to check the box of the best answer and explain your choice in the space provided.

Example Item: "The Balancing Beam"

- Mark 3
- [X] Mark 7
- Mark 8
- Mark 10

Please explain your choice.

Equal weights should be placed at equal distances from the center.

Item 1: "Pieces of Clay"

- [X] The pieces weigh the same.
- [X] The ball weighs more.

Please explain your choice.

You did not add or take away any clay.
Item 2: "Metal Weights"

- The water will rise to a **higher** level.
- The water will rise to a **lower** level.
- The water will rise to the **same** level.

Please explain your choice.

The metal weights are the same size so they will displace equal amounts of water.

---

Item 3: "The Pendulum Length"

Which pendulum or pendulums would you use for the experiment?

- 1 and 2
- 1 and 3
- 2 and 3
- 1, 2, and 3
- 2 only

Please explain your choice.

Everything is the same except the length so you can tell if length makes a difference.
Item 4: "The Pendulum's Weight"

Which pendulum or pendulums would you use for the experiment?

☐ 1 and 2
☒ 1 and 3
☐ 2 and 3
☐ 1, 2, and 3
☐ 3 only

Please explain your choice.

Everything is the same except weight so you can tell if weight makes a difference.

Item 5: "The Balancing Beam 1"

Where would you hang the 5-unit weight to make the beam balance?

☐ Between Mark 3 and 4
☐ Mark 7
☐ Mark 12
☒ Mark 14
☐ At the end

Please explain your choice.

It's half the weight so it should be twice the distance.
**Item 6: "The Balancing Beam 2"**

Where would you hang the 10-unit weight to make the beam balance?

- [ ] Mark 5
- [x] Mark 6
- [ ] Mark 7
- [ ] Between Mark 6 and 7
- [ ] Mark 8
- [ ] Mark 9
- [ ] Mark 10
- [ ] Mark 17

Please explain your choice.

The 10-unit weight is \( \frac{2}{3} \) of the 15-unit weight, so it must be placed \( \frac{3}{2} \) as far out.

\[
3 \frac{1}{2} \times 4 = 6
\]

**Note:** If a student uses the formula: \( w_1 \times d_1 = w_2 \times d_2 \) to solve the problem, this does not indicate the use of formal reasoning. The item should be dropped from consideration.
Item 7: "The Metal Box"

The objective of this puzzle is to discover which switch or switches must be flipped to make the light turn on.

Example:

<table>
<thead>
<tr>
<th></th>
<th>ON</th>
<th>OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>y</td>
<td></td>
</tr>
</tbody>
</table>

Your Record:

1. y  11. y, r, b  21. 
2. r  12. y, r, g  22. 
3. b  13. y, b, g  23. 
4. g  14. r, b, g  24. 
5. y, r  15. y, r, b, g  25. 
6. y, b  16. 
7. y, g  17. 
8. r, b  18. 
9. r, g  19. 
10. b, g  20. 

Note: The combinations need not be in this order to be correct. There must be all 15 and no repetitions.
### Item B: "The Shopping Center"

In a new SHOPPING CENTER, 4 store locations are going to be opened on the ground level.

A BARBER SHOP, a DISCOUNT STORE, a GROCERY STORE, and a RESTAURANT want to move in there. Each one of the stores can choose any one of the 4 locations. Write ALL THE POSSIBLE WAYS that the stores can occupy the 4 locations. Write on the lines below the letter B for BARBER SHOP, the letter D for DISCOUNT STORE, the letter G for GROCERY STORE, and the letter R for RESTAURANT.

<table>
<thead>
<tr>
<th>BDGE</th>
<th>DBGC</th>
<th>GBCD</th>
<th>CBGD</th>
</tr>
</thead>
<tbody>
<tr>
<td>BDCG</td>
<td>DBCG</td>
<td>GBDC</td>
<td>CRDG</td>
</tr>
<tr>
<td>BGCD</td>
<td>DGCb</td>
<td>GDBC</td>
<td>CGBD</td>
</tr>
<tr>
<td>BGDC</td>
<td>DGBC</td>
<td>GDBC</td>
<td>CGDB</td>
</tr>
<tr>
<td>BCGD</td>
<td>DCGB</td>
<td>GCBd</td>
<td>CDBG</td>
</tr>
<tr>
<td>BCDG</td>
<td>DCBG</td>
<td>GCDb</td>
<td>CDGB</td>
</tr>
</tbody>
</table>

Note: The permutations need not be in this order to be correct. There must be all 24 and no repetitions.
Item 9: "The Squares"

Three yellow squares and three red squares are put into a sack. What are the chances of pulling out a red square on the first try?

- 1 out of 1
- 1 out of 2
- 1 out of 3
- 1 out of 6
- 2 out of 6
- 4 out of 6
- 3 out of 3
- other

Please explain your choice.

3 of the 6 squares were red

\[
\frac{3}{6} = \frac{1}{2}
\]

Item 10: "Squares and Diamonds"

Three red squares, four yellow squares, and five blue squares are put into a sack. Four red diamonds, two yellow diamonds, and three blue diamonds are put into the same sack. What are the chances of pulling out a red piece on the first try?

- 1 out of 1
- 1 out of 2
- 1 out of 3
- 1 out of 4
- 1 out of 6
- 1 out of 21
- 7 out of 21
- 1 out of 7
- other

Please explain your choice.

7 of the 21 pieces are red

\[
\frac{7}{21} = \frac{1}{3}
\]
Appendix F

Simple and Partial Correlation Coefficients for Parental Support and Imaginary Audience Scale
Table 26
Correlation Coefficients for Perceived Paternal Support and Imaginary Audience Scale

<table>
<thead>
<tr>
<th></th>
<th>Factor 1 (emotional support)</th>
<th>Factor 2 (rejection-control)</th>
<th>Factor 3 (physical affect)</th>
<th>Factor 4 (withdrawal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abiding Self</td>
<td>-.112* (-.112)*</td>
<td>.022 (.021)</td>
<td>-.104* (-.104)</td>
<td>.008 (.007)</td>
</tr>
<tr>
<td>Transient Self</td>
<td>-.151* (-.138)*</td>
<td>.001 (-.019)</td>
<td>-.059 (-.051)</td>
<td>.100* (.078)</td>
</tr>
<tr>
<td>Imaginary Audience</td>
<td>-.176* (-.166)*</td>
<td>.024 (.001)</td>
<td>-.097* (-.092)</td>
<td>.079 (.063)</td>
</tr>
</tbody>
</table>

a Asterisks indicate significant results at p < .05.

b Numbers in parentheses indicate correlation with formal operational thought partialed out.
<table>
<thead>
<tr>
<th></th>
<th>Factor 1 (emotional support)</th>
<th>Factor 2 (physical affect)</th>
<th>Factor 3 (rejection-control)</th>
<th>Factor 4 (withdrawal)</th>
</tr>
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<tr>
<td>Abiding Self</td>
<td>-.063 (-.062)</td>
<td>-.106* (-.106)*</td>
<td>-.032 (-.034)</td>
<td>.054 (.053)</td>
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<tr>
<td>Transient Self</td>
<td>-.164* (-.131)*</td>
<td>-.116* (-.081)</td>
<td>-.005 (-.040)</td>
<td>.158* (.124)*</td>
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<tr>
<td>Imaginary Audience Scale</td>
<td>-.113* (-.110)*</td>
<td>-.145* (-.121)*</td>
<td>-.038 (-.062)</td>
<td>.138* (.114)*</td>
</tr>
</tbody>
</table>

*a* Asterisks indicate significant results at p < .05.

*b* Numbers in parentheses indicate correlation with formal operational thought partialed out.
Appendix G

Script and Materials for Modified Classroom

Test of Formal Operations
This test is called the Classroom Test of Formal Operations. It consists of a number of demonstration items that lead to problems. Solutions of the problems involve reasoning that is useful in solving problems in a variety of areas. The test will provide information about how familiar you are with these strategies. Some of the items are very easy and some are quite difficult. Few students would be expected to get them all correct. Indeed, there may be a number of correct solutions to some of the items.

Please fill in the information in the top right-hand corner of the test booklet and then read the directions.

You will progressing through the items as a class. This means that some students may finish some items before others and will have to be patient until all (or nearly all) of the students have finished before going to the next item.

Now let's begin by looking at this balance beam. I have two 10-unit hanging weights. These marks are equally spaced along the length of the beam which balances like a teeter-totter when no weights are hung on it.

Where would the other 10-unit weight be hung to make the beam balance?

3½ minutes
Here I have two balls of clay. They are the same size and shape. They weigh the same. Does the pancake shape piece weigh more now? Do the two pieces weigh the same? or does the ball weigh more? Indicate your answer in the answer book and please explain your choice.

2½ minutes

Now I have two metal weights. They equal in height and thickness. They do not weigh the same. Over here I have cylinders filled with equal amounts of colored water. Notice that when I lower this weight into the cylinder that the water has risen. If the heavier weight were lowered into the cylinder, would the water level rise higher, the same, or lower than it did in the cylinder with the lighter weight? Mark your answer in the answer book and please explain your choice.

2½ minutes

Now I am going to work with three strings and three weights. I will attach the weights to the strings to make three pendulums. Pendulum #1 and #3 are the same length while pendulum #2 is longer. Pendulum #2 and #3 have the same weight, but pendulum #1 has a heavier weight. The pendulum takes about one second per swing. Suppose you wanted to do an experiment to find out if changing the length of the pendulum changed the amount of time it takes to swing back and
forth. Which pendulum or pendulums would you use for the experiment? Please explain your choice.

2½ minutes

Item 4

Suppose you wanted to do an experiment to find out if changing the weight on the end of the string changed the amount of time the pendulum takes to swing back and forth. Which pendulum or pendulums would you use for the experiment?

2½ minutes

Item 5

This time I have a balance beam and two hanging weights, one 10-unit weight and one 5-unit weight. I will hang the 10-unit weight 7 marks from the center. Where would you hang the 5-unit weight to make the beam balance?

2½ minutes

Item 6

This time I have two more weights with the balance beam, 15-unit hanging weight and a 10-unit hanging weight. I will hang the 15-unit hanging weight 4 marks from the center. Where would you hang the 10-unit weight to make the beam balance. Mark your answer in the book and please explain your choice.

2½ minutes

Item 7

Now I want you to look at this box with four switches, a light bulb and a black button. The switches are identified by four colors so that there is a "yellow switch," a "blue switch," a "red switch," and
"green switch." The switches can be flipped into either an "up" position or a "down" position. If the correct switch or switches are flipped into the up position, and the black button is pushed, the bulb will light.

The bulb will light when the correct switches are flipped. The objective of this puzzle is to discover which switch or combinations of switches must be flipped to make the light turn on? To do this you would actually need to use the box, but since there is only one box, you can only indicate how you would go about flipping switches to find out. Look at the symbols y, b, r, and g, in the answer book and the spaces labeled "your record." Let's try switch y, the yellow switch, to see if the light turns on. Indicate in the Example space above the box that y was switched and the light stayed off. On each try the order in which the switches are flipped does not matter. For instance, y, r, and r, y are the same trial so you should not write down both.

3½ minutes

In a new shopping center, 4 store locations are going to be opened on the ground level. A barber shop, a discount store, a grocery store, and a restaurant want to move in there. Each one of the stores can choose any one of the 4 locations. Write all the possible ways that the stores can occupy the 4 locations. Write on the lines below the letter B for barber shop, the letter D for discount store, and the letter G, for grocery store and the letter R for
restaurant. These are the four stores—a barber shop, a discount store, a grocery store and a restaurant. This order corresponds to the order on the first line in the answer booklet. This means that the barber shop is in the first store location on the left, the discount store is in the second store location, the grocery store is in the third store location and the restaurant is in the fourth store location on the right. Now write all other possible ways that the stores could be arranged, one arrangement per line. There are extra lines in your booklet.

4½ minutes

For this task, I am going to use this cloth sack, three yellow wooden squares and three red wooden squares. Each square is identical in size and shape. Imagine that I am going to pull this piece out of the sack. What are the chances of pulling out a red square on the first try? Please explain your answer.

2½ minutes

This time I am going to use the cloth sack again, three red wooden squares, four yellow wooden squares, five blue wooden squares, four red wooden diamonds, two yellow wooden diamonds and three blue wooden diamonds. All of the square shaped pieces are identical in size and shape as are all the diamond shaped pieces. Imagine that I am going to pull this piece out of the sack. What are the chances of pulling out a red piece on the first try? Indicate your choice in the answer book and please explain your answer.
MATERIALS USED IN CLASSROOM TEST OF FORMAL OPERATIONS

Example

To make a balance beam, two yardsticks glued together were used. A hook was placed in the middle so the yardsticks could be suspended from a frame. The yardsticks were painted white and renumbered with the center point being zero and each inch to the left and right of the center being 1, 2, 3 etc. to 18. There were eighteen marks on each side of the center. The yardstick was suspended from a brown wooden frame made from 2" x 2" pine. Three hooks were placed on the bottom of the upper beam of the frame of use in several exercises and the middle hook was used for this task. The weights were borrowed from the physics department at Utah State. They were hanging weights to which additional discs could be added for additional weight. Hooks were placed on the bottom of the yardstick at one inch intervals and the hanging weights were suspended from these.

Item 1

Molding clay purchased at a toy store was used for this task. No balance pan was available so the examiner presented verbally that the clay balls were of equal weight while holding them at equal heights.

Item 2

The weights used for this exercise were also available at the physics department and consisted of two round metal balls approximately two inches in diameter of different densities. Since no
balance pan was available for presentation of their differences in weight, the examiner indicated this verbally while demonstrating by holding one higher than the other that one was heavier. The weights were lowered into two glass twenty five milileter cylinders filled with green colored water. The water was colored with food coloring to make the level more visible when the weight was lowered.

Item 3

The wooden frame made of 2" X 2" pine used in the example was also used for this item. The overall dimensions of the frame were four foot length and three foot height. Three pendulums were used in this exercise. They were made using weights available at the physics department, at Utah State and differing lengths of string. Two strings were the same length while one was longer. Two weights were five units and one was ten units. The pendulums were suspended from the three hooks at the top of the frame.

Item 4

Same materials as item 3.

Item 5

Same materials as those in the example.

Item 6

Same materials as those in example.
Item 7

This required the construction of a light box with materials available at a local hardware store---four switches, a light, and a button. The box was made approximately twelve inches wide, eighteen inches long, and four inches deep out of scrap lumber. It was then painted white. A square of a differing color was painted around each light switch with color assigned according to directions in the answer booklet.

Item 8

Five cardboard boxes found in a local grocery store varying in size from 12" to 18" inches square were used for this task. Each was covered with plain paper and then painted. Each box was a different color---red, green, blue, brown or yellow. A letter was painted with black tempera on the front of each box to indicate the kind of store it represented in the task, e.g., D for discount store.

Item 9

A white pillow case was used as a cloth bag for placement of the square and diamonds. The squares and diamonds were made out of scrap plywood and lumber and then painted the appropriate colors with tempera paint, i.e., three red wooden squares. The squares were 1" X 2" blocks, while the triangles were approximately 3" base and 4" height.

Item 10

Same materials as those used in Item 9.
VITA
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Candidate for the Degree of
Doctor of Philosophy

Dissertation: Adolescent Egocentrism and Its Relationship to Parenting Styles and the Development of Formal Operational Thought

Major Field: Psychology

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