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LA THÈSE A ÉTÉ  
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The Adolescent's Use of Formal Operations  
in Solving Problems Related to  
Identity Resolution



by B. Leadbeater.

Thesis submitted to the School of Graduate  
Studies of the University of Ottawa in  
partial fulfillment of the requirements  
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B. Leadbeater, Ottawa, Canada, 1978

## Curriculum Studiorum

Bonnie Leadbeater (nee Ross) was born in Edmonton, Alberta, on February 6th, 1950. She obtained the Degree of Bachelor of Science in Nursing from the University of Ottawa in 1972.

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Abstract of  
The Adolescent's Use of Formal Operations  
in Solving Problems Related to  
Identity Resolution

The adolescent's use of formal operations in solving problems related to identity resolution was investigated. Congruent with the developmental theories of Erik Erikson and Jean Piaget, it was hypothesized that adolescents who show aptitude, interest, and involvement in considering identity-related issues apply formal operational thinking more consistently in these considerations and that this use of formal operational thinking enhances the positive resolution of the identity crisis. Formal operational thinking was assessed by means of the Watson-Glaser Critical Thinking Appraisal. Marcia's Identity Status Interview was administered to categorize adolescents in the sample into one of four identity statuses, which indicate different ways of resolving the crisis of identity, namely: identity achievement, moratorium, foreclosure, and identity diffusion. A cross-sectional study, using a sample of 95 male adolescents with average age of 18.6 years, was carried out. Results supported the hypothesis that individuals in the identity achievement and moratorium identity statuses, the more positive outcomes of the identity crisis, apply formal operational thinking more consistently than individuals in the foreclosure and identity

diffusion statuses. Individuals in the moratorium status who are reported in the literature to be in the status experiencing the highest anxiety are expected to use formal operational thinking less consistently than those in the identity achievement status. However, in this study the moratorium individuals obtained scores on the Watson-Glaser Critical Thinking Appraisal similar to the identity achievement individuals. Also, in support of the hypothesized relationship, the use of formal operational thinking and identity resolution were found to be moderately dependent using a Chi square statistic. Suggestions for future research include an investigation of the relationship between identity development and formal operational thinking in female adolescents, a study of antecedent factors related to the lack of interest and involvement of foreclosure and identity diffusion individuals in identity-related issues, a study of sociological factors influencing identity resolution and the development of a pen and pencil measure of identity statuses. The importance of opportunities for the adolescent in the stage of identity vs identity confusion to clarify and consider many alternate occupational roles, religious beliefs, and ideological stances is emphasized in the conclusion.

## Introduction

Adolescence, according to Erik Erikson (1960), is the critical period in an individual's life cycle for forming one's identity. It is also in adolescence, according to Barbel Inhelder and Jean Piaget (1958), that formal operational structures of the intellect develop. The purpose of this study is to contribute to an understanding of the relationship between identity resolution and the development of formal operational cognitive structures, by investigating the adolescent's use of formal operational thinking in solving problems related to identity resolution. It is argued that adolescents who show aptitude, interest, and involvement in considering identity-related issues use formal operational thinking more consistently in these considerations and that their use of formal operational thinking enhances the positive resolution of the identity crisis.

Previous attempts to study the relationship between identity formation and formal operational thinking (Berzonsky, Weiner, & Raphael, 1975; Cauble, 1976; Wagner, 1976; Rowe, 1977) have yielded contradictory results. In this study, a new approach to measuring formal operational thinking is proposed: Piaget (1972) hypothesized that, although all adolescents attain the level of formal operational thinking, the areas of content in which they actually use formal operations varies according to their particular

fields of aptitude, interest, and involvement. This suggests that the content of the measuring instrument employed to investigate the relationship between identity formation and formal thinking should be related to identity issues.

Erikson's concept of identity development and Piaget's theory of cognitive development are outlined in Chapter 1, their mutual relationship is discussed, and a statement of the research problem and hypotheses concluded the chapter. The procedures for testing the hypotheses and characteristics of the measuring instruments and subjects used are described in Chapter 2. In Chapter 3, the results are presented and discussed. A summary of the study and its implications for future research complete this report.

## Chapter 1

### Review of the Literature

The individual contributions of Erikson and Piaget to an understanding of adolescent development have been widely acclaimed in the literature. The convergence of their theories was recognized by Erikson (1968) in his suggestion that formal operational mental structures, which, in Piaget's view, characterize adolescent cognitive development, assist the adolescent in choosing and committing himself to an identity. In the following discussion of the mutual implications of these two developmental theories, Erikson's and Piaget's views are presented successively. The related empirical research is then critically reviewed. This leads to a statement of the research problem and hypotheses.

#### 1. Erikson's Concept of Psychosocial Development in Adolescence

In his theory of psychosocial development, Erikson (1963, 1968) emphasizes the interaction of an individual with his society in the growth of a healthy personality. The individual's physical and cognitive maturation and his widening experiences with members and customs of his society determine his psychosocial (psychological and sociological)

development; that is, his development as both a unique individual and as an involved member of his society. In Erikson's view (1968, pp. 93-94), this development proceeds according to epigenetic laws in eight stages across the life cycle; see Figure 1.

As illustrated in Figure 1, each stage is identified by positive and negative polar outcomes of a dominant developmental challenge or crisis. The positive outcome or strength of each stage is indicated on the left side of the figure and the negative outcome or maladjustment is seen on the right. The stages are hierarchically related such that readiness to meet the major challenges or crisis of one stage depends on successful resolution of the major crises of preceding stages. As well, the psychosocial crisis that is dominant at one stage is not resolved once and for all at that stage but is encountered again at subsequent stages in a different form. The crisis of trust vs mistrust, for example, which is resolved in infancy in a sense of personal trustworthiness and confidence in others, is encountered in adolescence in the need for a sense of faith in one's membership in his community.

The psychosocial crisis which Erikson (1968) believes dominates adolescence is identity vs identity confusion. He states that it is the task of young people in "later school years" (Erikson, 1968, p. 128) to find some resolution to

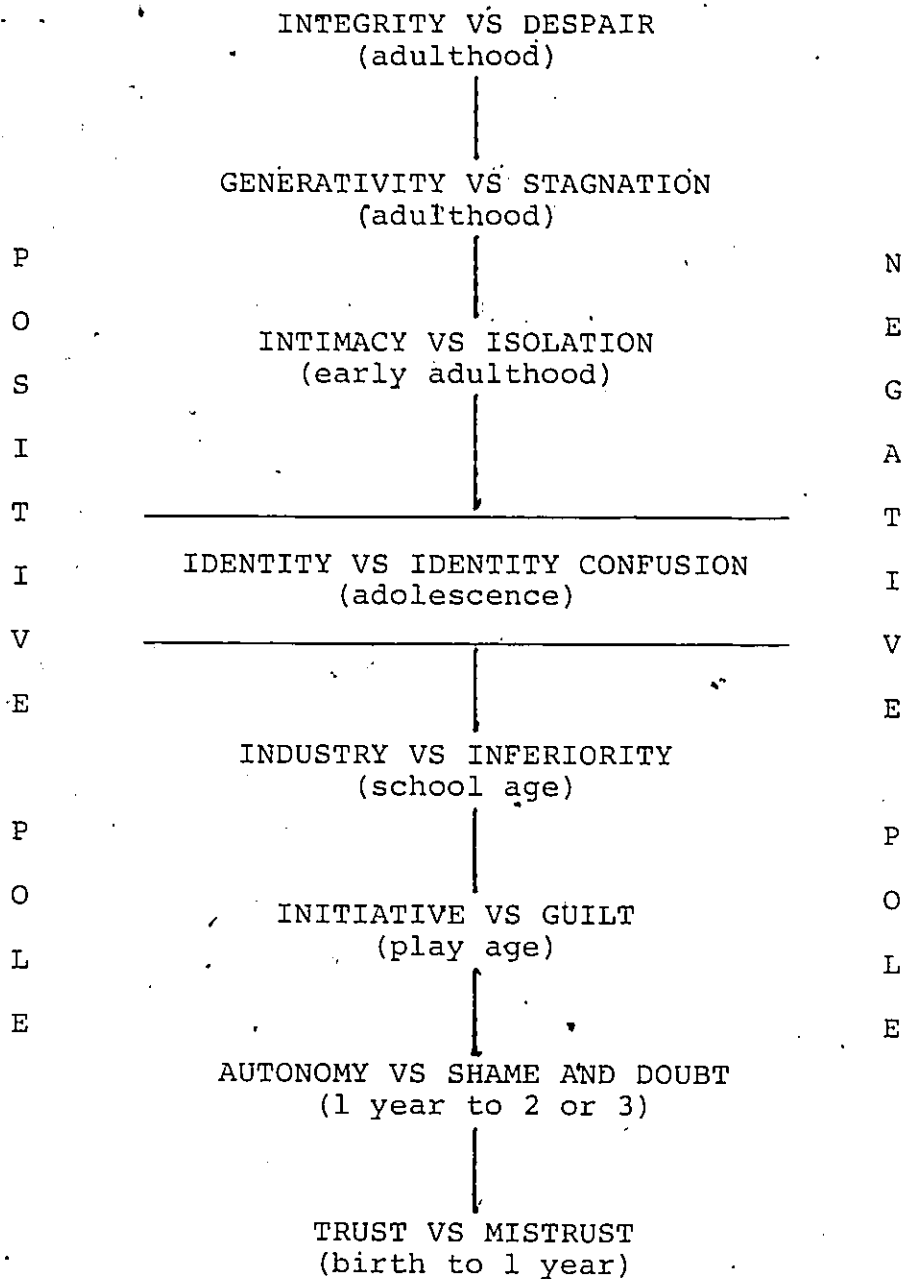


Figure 1: Erikson's stages of psychosocial development showing the positive and negative polar outcomes at each stage.

this crisis. Empirical studies have confirmed Erikson's view in suggesting the 18 to 21 year old period as the most critical age for identity resolution in North American adolescents. In a study of five age groups of males: 12, 15, 18, 21, and 24, Meilman (1977) found that the greatest change in identity status, as measured by Marcia's (1966) Identity Status Interview, occurs between 18 and 21 years of age. Stark and Traxler (1974) found that 21 to 24 year old college students had higher ego identity scores, on an identity measure constructed by Dignan (1965) than did 17 to 20 years old students. As well, in their longitudinal study, D. Offer, Marcus and J. Offer (1970) reported that 19 to 20 year old males were in the process of consolidating identity related areas of their lives and appeared to be about to resolve the crisis of this stage. In a review of the literature on identity in adolescence, Marcia (Note 1, p. 17) indicates that identity increases from early adolescence (age 12) to late adolescence (age 18 to 21), and that by the age of 21 most males have achieved a sense of identity.

The concept of identity will now be defined and the major concerns of an individual in this stage outlined. The process of identity formation is then presented by delineating four identity statuses which are suggested in Erikson's writings and elaborated by Marcia (1966), namely: identity achievement, moratorium, foreclosure, and identity diffusion.

Empirical studies related to these four statuses are also reviewed.

### 1.1. The Definition of Identity

Identity has recently been defined by Erikson (1975) as:

a subjective sense as well as an observable quality of personal sameness and continuity, paired with some belief in the sameness and continuity of some shared world image. (p. 18)

In accordance with Erikson's earlier definitions of identity (1963, p. 661 and 1968, p. 208), this definition emphasizes three elements of identity: namely, a sense of personal uniqueness; a sense of solidarity with one's community; and a sense of continuity of experience which spans past, present, and future. The individual who has a sense of identity is aware of the continuity of his own uniqueness and of the roles and ideals he shares as a member of a society. Past childhood identifications, present self-images and anticipated roles and ideals, which one would hold as an adult member of a society, are integrated in an identity: a coherent configuration of personality, which is recognized and accepted by that society.

### 1.2. The Process of Identity Formation

The development of a sense of identity, while considered by Erikson (1968) to be most critical in adolescence, also depends on the successful resolution of the crises of the preceding psychosocial stages. From the successful resolution of the stage of trust vs mistrust the adolescent gains a sense of faith that his society will provide him with future opportunities and ideals "in whose service it would seem worthwhile to prove oneself trustworthy" (Erikson, 1968, p. 129). Likewise, from the successful resolution of the second stage, autonomy vs shame, the individual acquires a sense of self-certainty and a desire to choose freely his future roles. The third stage, initiative vs guilt, contributes an imagination of what one might become. It gives a willingness to experiment with possible adult roles. The desire to persevere, to do or be the best in one's chosen role, is the legacy of the fourth stage, industry vs inferiority. It is at the fifth stage, identity vs identity confusion, that these various attributes are subsumed in an integrated sense of one's individual worth by a chosen identity. The stage of identity vs identity confusion can thus be seen as that stage in the process of identity development which spans childhood and adulthood.

Four ways of dealing with the crisis of identity during this stage can be distinguished in Erikson's (1968) writings;

namely, identity achievement, moratorium, foreclosure, and identity confusion or diffusion. Each way can also represent a possible outcome of the stage of identity vs identity confusion as it may become a way of life or a state of identity for an individual. In general, identity achievement and moratorium can be considered the more positive polar outcomes of this stage, and identity diffusion and foreclosure, the more negative.

Ideally, the crisis of identity is dealt with during a period of moratorium in which adult commitments are delayed. During this period, the individual experiments with possible roles and ideologies offered by his society. According to Erikson (1968, p. 165), this is a period of both self-assertion and self-consciousness created by an increased sensitivity to the recognition of others in his society. The adolescent in the state of moratorium makes several serious but short-lived commitments to new roles while seeking those which best fulfill his need for self-expression and for recognition from his society.

Most adolescents progress from this moratorium of tentative commitments to a state of identity achievement in which lasting commitments are made to preferred roles and ideologies in their society. An optimal sense of identity is experienced as a sense of well being. Erikson (1968) describes this as a "feeling of being at home in one's body,

a sense of "knowing where one is going", and an inner assuredness of anticipated recognition from those who count" (p. 165).

Some individuals, however, do not experience a period of moratorium.. They prematurely commit themselves to roles and ideologies prescribed to them by authorities or circumstances in their society (Erikson, 1968, p. 158). They are said to have foreclosed on an identity which reflects external prescriptions, and childhood identifications and expectations of adult roles.

Finally, some individuals avoid committing themselves to an identity and thus fail to resolve their confusion about who they are and how they fit into society. These individuals are considered to be in a state of identity confusion or diffusion. They tend to avoid entangling commitments either to self-images or societal roles. In Erikson's view (1968, pp. 167-188), these individuals have difficulty concentrating on a task and persevering to finish it. They rarely experience a sense of accomplishment. They may seem preoccupied and behave as if investment in the future is futile. These adolescents often seem to be rephending both themselves and their society. They generally avoid competition and seem to be waiting for the future to change their lot. They may feel that there is no niche in their society for the expression of their unique gifts or seem unaware that they have something to

offer society. They may be apathetic and feel estranged from their community or they may impinge heavily on it to fulfill their own demands. Although much of this identity confusion is experienced by every adolescent during the stage of identity, for some it seems to become a way of life: a state of identity diffusion.

The four statuses of identity resolution: identity achievement, moratorium, foreclosure, and identity diffusion have been operationalized by Marcia (1966). He used two criteria to classify individuals into one of four identity statuses; namely, (1) the presence or absence of a crisis: a period of active decision making or moratorium, and (2) the presence or absence of an individual commitment in the areas of occupation and ideology: political and religious. Using these two criteria, the identity statuses operationally defined are: (a) identity achievement: individuals who have gone through a crisis and are committed to an occupation and ideology: (b) moratorium: individuals who are currently in an identity crisis in that they are struggling with occupational and ideological issues: (c) foreclosure: persons who have made an occupational and ideological commitment but who have never experienced a crisis: (d) identity diffusion: individuals who have made no occupational or ideological commitment, regardless of whether or not they have previously experienced a crisis.

Subsequent studies, using Marcia's operationalized definitions, have contributed to a clearer profile of each of these statuses. In order to elaborate these profiles, it is useful to present the major findings of these studies for each identity status separately.

Identity achievement individuals were found to be more autonomous on the Edward's Personal Preference Schedule (Orlofsky, Marcia & Lesser, 1973) and more internally controlled (Waterman, C., Buebel & Waterman, A., 1970) than were individuals in the other identity statuses. They were also less likely to alter their self-evaluations in response to positive or negative feedback (Marcia, 1967). Studying Kohlberg's levels of moral development, Podd (1972) found that a larger number of identity achievement individuals used postconventional moral reasoning. As well, the identity achievement individuals tended to make lasting, more intimate relationships with members of the same and opposite sex (Orlofsky et al., 1973). Considering the impulsivity-reflectivity dimension of cognitive style, identity achievement individuals were more reflective; that is, they responded more slowly and made fewer errors (Waterman, C., & Waterman, A., 1974). In a study by Marcia (1966), identity achievement individuals had superior performance scores on a stressful concept attainment task. The task was made stressful by the tester who suggested that the test results were:

predictors of college success and who, oversolicitously, encouraged the individuals taking the test to be comfortable before beginning. The identity achievement individuals had better overall scores and fewer instances of giving up, in Marcia's (1966) research, and they maintained a realistic level in estimating their success on subsequent test items when given feedback on their results for each test item.

Individuals in the moratorium status had results similar to those in the identity achievement status in most of the studies. They were, however, found to be more anxious than the individuals in the other three identity statuses on the Welsh Anxiety Scale (Marcia, 1967). Moratorium individuals were also described by Donovan (1975), as more self-involved and self-questioning; they were undecided about occupational, religious, and political commitments but seemed active in confronting these issues. Although Donovan studied only a small sample of individuals (n=21), his results seem to provide an in-depth view of individuals in the moratorium, foreclosure, and identity diffusion statuses. Individuals in his study were interviewed using Marcia's identity status interview; they were administered the Rorschach Inkblot Test, the TAT, and the Early Memories Inventory; and they kept a diary of their activities for one week.

The most outstanding characteristic of individuals in the foreclosure status, which was found in empirical studies,


was a tendency to endorse authoritarian values, as measured by the authoritarian submission and conventionality sub-cluster of the California F Scale (Marcia, 1966, 1967). Foreclosed individuals were found to be more externally oriented in their locus of control than were individuals in the other three identity statuses (Waterman, C., Buebel, & Waterman, A., 1970). They also showed greatest willingness to involve their families in their own life-decisions (Waterman, A., & Goldman, Note 2). They changed their self-evaluations more readily in response to positive and negative feedback than did identity achievement and moratorium individuals (Marcia, 1967). Foreclosed individuals were described by Donovan (1975), as continually conscious of the opinion of others; they were cautious and distant in their perceptions of the outside world; and they were conscientious students and led regular, well-ordered lives. Interpersonal relations in this group tended to be stereotyped and usually lacked the depth and closeness that characterized relations of individuals in the identity achievement status (Orlofsky et al., 1973). Foreclosed individuals had the lowest scores on the Welsh Anxiety Scale (Marcia, 1967); they also had the lowest performance scores on the stressful concept attainment task and set unrealistically high goals for their success on subsequent items of the test, following feedback about their previous results. They were also found to be more impulsive

on the impulsivity-reflectivity dimension of cognitive style (Waterman, C., & Waterman, A., 1974).

In most of the studies, results for individuals in the identity diffusion status were similar to those in the foreclosure group. The former individuals, however, were less endorsing of authoritarian views (Marcia, 1967). They were also found to be the least intimate in their interpersonal relations, compared to individuals in the other three statuses and were most isolated in their interests (Orlofsky et al., 1973). Identity diffusion individuals were reported by Donovan (1975) to be vague in their answers and to often be withdrawn: they tended to keep irregular hours, slept more and engaged in few activities with others.

In the foregoing discussion, four possible outcomes of the stage of identity vs identity confusion have been distinguished. It now seems particularly relevant to ask why these variations occur.

In considering factors which influence the outcome of the stage of identity vs identity confusion, Erikson (1968) is primarily concerned with the ways in which the social order influences the resolution of this stage. He also claims, however, that the achievement of formal operational cognitive structures "complements" identity resolution (p. 245). He states that with formal operations:



the youth can now operate on hypothetical propositions and can think of possible variables and potential relations--and think of them in thought alone, independent of certain concrete checks previously necessary. (p. 245)

These abilities assist the individual in selecting personal, occupational, sexual, and ideological commitments from the many possibilities offered by his society.

In referring to the adolescent's ability to use formal operations, Erikson suggests that there is a link between his concept of identity development and the cognitive developmental theory of Jean Piaget. It is Piaget's view (1972) that formal operational structures of the intellect characterize adolescent thinking, particularly in those content areas in which the individual has some aptitude, interest, or involvement. Piaget's theory of cognitive development in adolescence will now be outlined.

## 2. Piaget's Theory of Cognitive Development in Adolescence

Intellectual or cognitive development, according to Piaget (1950), involves gradual upward movement through four stages: the sensorimotor, preoperational, concrete operational and formal operational stages. The mental structures characteristic of each stage determine both the individual's perception of the universe and his ability to adapt to it.

Thus, the stage reached by an individual may be inferred from observation of his behaviour and problem-solving abilities. Before moving to a description of the mental structures which specifically characterize adolescent cognitive development and the problem-solving abilities which result from these structures, the general principles which underlie Piaget's theory will be identified.

### 2.1. General Principles of Cognitive Development

According to Piaget's (1976, pp. 350-386) theory, the sequential development of mental structures is based on the processes of accommodation and assimilation, which operate invariantly across the developmental stages from childhood to adulthood; and on the differentiation and coordination of these two processes, resulting in a state of mental equilibrium between them.

The processes of assimilation and accommodation denote the ways in which an individual interacts with phenomena in his perceptual field. Assimilation involves reacting to the phenomena in terms of previously learned responses. This can mean distorting what is perceived so that it can be comprehended in relation to past experiences. Accommodation, on the other hand, is functioning when the demands of the environment, including the newness of some aspects of it and

the reality insisted on by other people, cause the individual to behave in new ways. With accommodation, the mental structures themselves are modified to conform to reality.

The processes of assimilation and accommodation are initially undifferentiated and uncoordinated. Assimilation reduces or distorts experiences to relate them to past responses and accommodation is bound to moment-to-moment perceptions of phenomena. The processes operate in the opposite directions of subjective incorporation of reality against objective conforming to reality. With the gradual development of more complex mental structures, however, the opposing processes are equilibrated. Mental structures reach a level of complexity such that assimilation, rather than distorting reality, organizes it by incorporating it into a mental system of relations. Momentary perceptions are elaborated and corrected by the individual's awareness of the past states and future possible transformations of these perceptions. Accommodation, directed by this awareness of relations or possible transformations, no longer merely passively conforms to reality but seeks out the meaning in novel experiences. Thus, the individual's ability to organize reality is balanced by his ability to recognize a reality separate from his perceptions and actions, resulting in a more stable mental equilibrium.

The evolution of thinking towards this equilibrium is

a step by step process of differentiating subjectivity and objectivity. In interacting with his environment, the individual progresses from a stage in which he lacks an awareness of the permanence of objects separate from his perceptions (sensorimotor), to a stage in which changes in perceptions are undifferentiated from the individual's actions (preoperational), and from there to a stage in which his thinking is gradually separated from what is perceived or acted on (operational). In Inhelder's and Piaget's (1958) view, it is operational thinking: concrete and formal, which characterizes adolescent cognition. An elaboration of these stages of operational thinking yields a picture of Piaget's view of the nature of adolescent mental structures and the abilities which stem from these structures.

### 2.2. The Concrete Operational Stage

By the end of the sensorimotor stage (about age two), the child is aware of an object's permanence, independent of his perceptions and of the effects of his actions. At the preoperational stage (about age two to seven) the child is able to mentally represent his perceptions and is able to deal with single classes or concepts; such as, dogs, tables, etc. It is not until the concrete operational stage, however, that the individual begins to actively organize or

classify his mental representations logically. Also, at the concrete stage, the individual first becomes aware that his momentary perceptions are functions of previous perceptual states. In Inhelder's and Piaget's (1958, p. 248) words, at the concrete stage "every state is conceived of as the result of a transformation."

Two abilities: first, to classify perceptions into classes, subclasses, intersecting classes and seriations; and second, to see existing perceptions as reversible, are the distinguishing features of concrete operational thinking. Changes in perceptions are seen as reversible when the possibility of a return to the starting point is understood (Inhelder & Piaget, 1958, p. 272). Reversibility is possible either by cancelling an operation that has already been performed or by compensating the difference to create a state that is equivalent to the starting point. The former operation is called "inversion" or "negation" and the latter is called "reciprocity" (Inhelder & Piaget, 1958, p. 273). Not until the child conceives his momentary perceptions in relation to classifications or groupings of possible reversible perceptions, can he mentally organize or operate on phenomena in a meaningful way.

Because of the individual's ability to classify his perceptions and conceive their transformations, the equilibrium between assimilation and accommodation is to a great

extent stabilized. There are, however, limitations to this stability which stem from the fact that concrete operational thinking is confined to the organization of empirical data. First, in considering data derived from observation or experience only, the concrete thinker is limited to inductive problem solving. Rather than beginning with an hypothesis of the possible relations among the data, the concrete thinker begins by observing the data at hand and then organizes them according to the rules of classification and seriation.

This inductive approach to problem solving results in a second limitation of the concrete operational stage; namely, that considerations of what is possible are limited to extensions that are perceivable. The concrete thinker's ability to reflect on future possibilities depends on his capacity to anticipate new possible class members; for example,  $A + B + C$  can be extended by including the elements D and E.

A third limitation of concrete thinking, which results from its dependence on real data, is an inability to separate thinking from what is thought about. Without a general mental link across concrete groupings, there is a lack of integration or coordination among the groups and between the two types of reversibility: negation and reciprocity. Classes can be dissolved and reformed; however, "they exist as more or less separate islets of organization" (Flavell, 1963, p. 204). As well, because the individual is unable to

coordinate negation and reciprocity, he is unable to coordinate several variables in a single system.

At the stage of concrete operations, therefore, the individual has difficulty solving problems in which either one effect is the result of concomitant causes or the causal factors are masked by the existence of several other variables. For example, Inhelder and Piaget (1958, p. 250) noted that, in considering the amount of work necessary to lift objects, the concrete thinker could determine that heavier objects require more work and that greater distances require more work. He failed, however, to coordinate the two factors in an overall rule.

These limitations are gradually overcome as the individual becomes more and more proficient in classifying concrete data. He begins to notice overlappings, inconsistencies and gaps in his analysis. Contradictions and questions become apparent. This sets the stage for the transition to the cognitive structures that characterize formal operational thinking.

### 2.3. The Formal Operational Stage

In contrast to the many independent groupings that describe the structures of concrete operations, two core systems: the "combinatorial" and "INRC group", characterize formal operational structures of the intellect

(Inhelder & Piaget, 1958, chap. 17). This, in itself, suggests that the formal operational mental structures form a more integrated mental construct, compared to the structures of earlier stages.

At the stage of formal operational thinking, the individual is able to use combinatorial analysis to logically and systematically generate all possible combinations of empirical or abstract variables involved in a problem. It is the lattice, or network, of all possible combinations thus formed that Inhelder & Piaget (1958, pp. 287-288) call the "combinatorial system". Using this combinatorial system, the formal operational thinker is able to identify or isolate all the variables in a problem. He is then able to systematically combine these variables by means of conjunctions, disjunctions, implications, equivalences, exclusions, incompatibilities, etc., and to deduce the total system of possible links or transformations among them. Each possibility can be considered as a proposition or hypothesis and can be experimentally or analytically verified. In contrast to the inductive thinking of the concrete operational stage, at the formal stage thinking is deductive. The formal operational thinker seeks to explain rather than merely describe the relations among the variables in a situation.

Whereas the combinatorial system accounts for many possible links between variables, the INRC group system yields

further possible transformations. The combinatorial operations are considered to be a "prerequisite condition" (Inhelder & Piaget, 1958, p. 313) for the development of the propositional operators of the INRC group system.

Essentially, the INRC group system comprises four operations: (I) identity, (N) negation, (R) reciprocity, and (C) correlative. For example, a weight added to a balance scale can be reversed by taking the added weight away (negation), or by adding an equal weight to the opposite side (identity). It can also be compensated for by moving the balance tray further from the center of the scale (reciprocity). The ability to reverse the reciprocity operation: returning the scale to an unbalanced condition, is what is meant by correlative. These operations facilitate the formulation of a general rule which applies to the whole problem, such as: increasing the weight and reducing the distance is equivalent to decreasing the weight and increasing the distance (Inhelder & Piaget, 1958, p. 316). Thus, the INRC operations enable the individual to reverse a mental operation. At the concrete stage, reversal is possible by negation or by reciprocity. At the formal operational stage, on the other hand, reversal is possible by both negation and reciprocity. This means that a change in a variable can be reversed not only by undoing the change but also by holding it constant

and manipulating a second variable to cause a return to the starting point. Thus, the individual is able to coordinate many variables at once.

The individual's ability to use the two core systems: the combinatorial and INRC group, results in a major advance in cognitive development. No longer is thinking confined to the organization of real data as it is at the concrete operational stage. On the contrary, the existing relations among the data become but some of many possibilities that could be considered. "The most distinctive property of formal thought is this reversal of direction between reality and possibility", according to Inhelder and Piaget (1958, p. 251).

Assimilation and accommodation reach a stable equilibrium at the formal operational stage. The individual is able to organize the data of a problem, within a coherent and complex set of possible combinations, with an awareness that for each transformation he could choose to perform there is a corresponding inverse transformation possible (Inhelder & Piaget, 1958, p. 267). Subjective assimilation is balanced by an awareness of the existence of many possible states that could exist. Strict accommodation to momentary perceptions is balanced by a tendency to look for the regularities that underlie appearances (Piaget, 1976, p. 385).

This final equilibrium fosters advances in the problem-solving abilities of the formal operational thinker. These advances can be summarized (from Inhelder & Piaget, 1958, chapters 16-18) as the abilities to:

- (A1) isolate and coordinate many variables at one time;
- (A2) conceive multiple possible combinations of the data;
- (A3) consider theoretical mental constructs;
- (A4) test the logical necessity of hypothesis and assumptions, not necessarily related to reality or to the individual's belief system, and
- (A5) deduce or infer the logically necessary, or best, conclusion.

A brief elaboration of each of these abilities shows the advantages of formal operational thinking.

The ability to isolate and coordinate many variables at one time is a result of the integration of negation and reciprocity into a single structure. This enables the individual to single out, or manipulate, one variable while holding the others constant and observing the effects on the total system being studied. The individual can thus deal with more complex problems than at the concrete operational stage, by considering many elements of a problem at

once. At the formal stage, the elements are coordinated to yield a general rule which explains the system.

The ability to conceive multiple possible combinations of the data stems from the existence of the network of possibilities which is characterized by the combinatorial and INRC group systems. The formal thinker conceives the real data to be but some of the many possibilities which could exist. This network of possibilities forms a system of possible transformations that the individual could make in manipulating the variables in a problem. According to Inhelder and Piaget (1958, p. 277), in order to arrive at a rule which explains the relations among the variables in a problem, it is necessary to begin by conceptualizing at least some of these possible combinations. The individual, at the formal operational stage, can formulate hypothesis of the possible relations in a problem. As well, if one approach to a problem fails to yield a satisfactory solution, the individual has recourse to many other possible solutions. Adaptation to present reality is thus complemented by an ability to anticipate future possibilities.

The ability to deal with theoretical mental constructs means that thinking is not confined to the concrete operations of organizing reality into independent systems of classes and relations. Rather, thinking now extends to manipulating or reflecting on the mental constructs

themselves. According to Inhelder and Piaget (1958, p. 254), formal thought involves a system of "second degree operations" - concrete operations being first degree operations in that they refer to reality directly. At the formal operational stage, theoretical mental constructs, in the form of hypotheses or propositions, can be manipulated mentally. For instance, ideals can be formed and evaluated. Piaget (Inhelder & Piaget, 1958, p. 349) believes that the structures of formal thinking are necessary to an understanding of such abstract ideals as humanity, nationality, social justice, etc.

The formal operational thinker also has the ability to test the logical necessity of hypotheses and assumptions, not necessarily related to reality or to the individual's own belief system. Each of the possibilities that the formal operational thinker can conceive, can be considered hypothetically and subsequently tested for its validity. The formal operational thinker can accept contrary-to-fact premises and proceed with an argument as if the premises were correct. An entire argument can, therefore, be considered from several different points of view.

Finally, at the formal operational stage, the individual can deduce or infer the logically necessary or best combination of possibilities. Possible combinations are treated as propositions or hypotheses and the individual, through

experimental and logical analysis, can determine the best conclusion. The acceptance of a conclusion depends on whether or not it can be logically inferred from the hypothesis, rather than on its verification by an appeal to empirical facts. If the hypotheses are true, then a certain conclusion must follow. "The connection indicated by the words 'if...then' (inferential implication) links a required logical consequence to an assertion whose truth is a mere possibility" (Inhelder & Piaget, 1958, p. 257).

In summary, the individual's capacity to deal with complex, theoretical problems appears to be enhanced by his use of problem solving abilities which stem from formal operational cognitive structures. The actual use that an individual makes of this capacity, however, seems to be content related. In Piaget's (1972, pp. 9-10) view, although most adolescents have the capacity to use formal operations, they tend to apply formal operational thinking only in those content areas in which they have some aptitude, interest, and involvement. Further, Erikson (1968, p. 245) suggests that the adolescent's use of formal operational thinking in content areas related to identity resolution, such as, occupational, sexual, and ideological issues, "complements" the resolution of the identity crisis.

Formal operational thinking and identity development thus appear to be mutually related, in that the individual's

aptitude, interest, and involvement in identity issues influence his use of formal operations in considering these issues; and his use of formal operations in considering these issues, in turn, affects the outcome of the stage of identity vs identity confusion. This mutual relationship will now be discussed more fully.

### 3. The Relationship Between Formal Operational Thinking and Identity Resolution

Four ways of dealing with the crisis of identity were previously distinguished as: identity achievement, moratorium, foreclosure, and identity diffusion. Individuals in each of these identity statuses seem to differ in their interest and involvement in identity-related issues. As well, in resolving the crisis of identity, their use of formal operations to consider identity-related issues is expected to vary.

Individuals in the moratorium status are characterized as being in a period of crisis. They are actively struggling with identity issues such as the occupational field to choose and the ideological beliefs to hold; and they are concerned about choosing an identity which fulfills their need for self-expression and for recognition from their society.

In thinking about such complex, ideological issues as nationalism, morality, religious beliefs, etc., the adolescent in the moratorium status seems to be using formal

operational thinking. Fundamental to his autonomous understanding and evaluation of these issues, is his ability to do more than merely describe the stand of his family or society. Rather, he must be able to grasp the hypothetical or theoretical significance of a belief and be able to deduce the consequences of committing himself to such a belief. It is possible, for example, to describe oneself as a Catholic because one grew up in a Catholic family. An autonomous commitment to the theoretical beliefs of Catholicism, however, requires an understanding of the implications that this commitment has for one's lifestyle, and an evaluation of the consistency of these beliefs with other aspects of one's experience. Individuals in the moratorium status also appear to use formal operational thinking in considering identity related issues in their willingness to experiment with many possible adult roles and ideologies. The adolescent in this status, using formal operations, considers the opportunities and ideologies offered by his society from several points of view and evaluates the compatibility of these viewpoints with his unique potentials and aptitudes. In this way, the adolescent can gradually coordinate his own self-expression and the opportunities and views of his society into an integrated sense of identity.

Individuals in the identity achievement status have passed through this period of moratorium before committing

themselves to an identity. During this period of moratorium, they have demonstrated both an interest and involvement in identity-related issues and appeared to show an ability to use formal operational thinking in considering these issues. They have resolved the crisis of identity by choosing an identity that is personally meaningful and that is affirmed by their society.

Individuals in the foreclosure status are distinguished by their tendency to endorse authoritarian values. Further, they appear to adopt roles and ideologies prescribed for them by authorities or circumstances in their society. Foreclosed individuals, seeing little need to independently consider other possibilities, do not experience a period of crisis. They can be described as lacking autonomous interest and involvement in identity related issues. In accepting the identity that is imposed on them with little consideration of how this limits or enhances the expression of their own potentials, these individuals seem to use formal operational thinking in dealing with identity issues less consistently than individuals in the identity achievement or moratorium statuses. Continuing with the previous example, it seems that these individuals would describe themselves as Catholic without much understanding of the basic beliefs of this religion. As well, without an awareness of the need to personally consider the consistency of their identity commitments and their own unique potentials,

individuals in the foreclosure status seem unable to move toward a more positive resolution of the identity crisis.

Individuals in the identity diffusion status also seem to show little aptitude, interest or involvement in issues related to identity resolution. These individuals seem to actually avoid considering these issues either by withdrawing or by engaging in activities which help to postpone any identity commitments. They are described as waiting for the future to change their lot. In view of this lack of interest and involvement in identity issues, it is unlikely that these individuals would use formal thinking in dealing with them. It also seems that while this lack of interest and involvement persists, these individuals fail to positively resolve the crisis of identity.

Thus, the relationship between formal operational thinking and identity resolution seems to be reciprocal: Those who show aptitude, interest, and involvement in considering identity-related issues appear to use formal operational thinking more consistently in these considerations. As well, their use of formal operational thinking appears to enhance the resolution of this stage of psychosocial development.

The relationship between formal operational thinking and identity resolution has been empirically studied. Findings of these studies, however, are contradictory.

Berzonsky, Weiner, and Raphael (1975), used two reasoning

tasks: the Concept Attainment Task and a Verbal Logical Syllogisms test, taken from Roberge (1971), to measure formal operational thinking. With a sample of 60 undergraduate females, they concluded that individuals in the identity achievement and moratorium statuses, as measured by Marcia's Identity Status Interview, did not do better than individuals in the foreclosure and identity diffusion statuses. Cauble (1976), using the same measure for identity status, reported no relationship between identity status and formal operational thinking, measured by three Piagetian Tasks. Cauble used a sample of 45 males and 45 females, age 18 to 23 years.

Wagner (1976), studying 10 to 18 year old males and females, and also using Marcia's Identity Status Interview, reported a correlation between the use of formal operations and identity status, with age. However, she used two Piagetian Tasks to measure formal operations: a combinatorial measure and a balance measure. She obtained a positive correlation between the combinatorial measure of formal operations and identity status, which increased with age, and a positive correlation between the balance measure of formal operations and identity status. This latter correlation, however, decreased with age.

Finally, Rowe (1977) found that the three identity achievement individuals in his comprehensive study of 22

college males showed an ability to use formal operations on several Piagetian Tasks. Also, when identity achievement and moratorium individuals, again classified using Marcia's Identity Status Interview, were considered together, six out of the seven individuals were able to use formal operations on all the Piagetian Tasks. This study, like the one by Wagner, lends some support to the view that formal operational thinking and identity resolution are related.

In view of these contradictory results, it is evident that further research is necessary. It is possible that in measuring formal operational thinking, the researchers in the above studies failed to take into account Piaget's (1972, p. 10) hypothesis that: although most adolescents have the capacity to use formal operations, they tend to apply formal thinking only in those areas of content in which they have some aptitude, interest, or involvement. More specifically, Piaget states that:

all normal subjects attain the stage of formal operations or structuring if not between 11-12 to 14-15 years, in any case between 15 and 20 years. However, they reach this stage in different areas according to their aptitudes and their professional specializations. (pp. 9-10)

Piaget gives the example of students in law (p. 11). These individuals would, he suggests, show an ability to use formal

operational thinking in considering juridical concepts but might not show the same ability with certain problems of physics.

Thus, it would be expected that most adolescents would use formal operational thinking in some situations and not in others. Also, within a particular field of content, individual variations in the use of formal operational thinking would be anticipated. When faced with the Piagetian Tasks, which are generally used to measure formal operational thinking and which relate mainly to scientific concepts, individuals who lack aptitude or interest in these fields might appear to be functioning at the concrete level. If they are tested with content related to their particular aptitudes, interests, or involvement, however, they would be expected to show an ability to use formal operational thinking. It also follows that, in order to demonstrate the use of formal operational thinking in dealing with issues related to a specific area of content, content associated with that field must be used in the testing situation. Thus, in investigating the adolescent's use of formal operational thinking in solving problems related to identity resolution, it appears that the test content must consist of identity related issues.

The Piagetian Tasks used by Cauble (1976), Wagner (1976) and Rowe (1977) emphasize mathematical or scientific concepts.

The Concept Attainment Task, used by Berzonsky et al. (1975) measures the individual's ability to discover a concept by considering six attributes; for example, number, shape and colour of 2x2 black and white slides. The Verbal Logical Syllogisms that were also used by Berzonsky et al. were of the symbolic form such as: "If there is a Q, then there is an R." (p. 7). Because the content in the above instruments is not related to the complex, theoretical issues of identity, such as career choice and ideological commitments, it is suggested that these studies failed to adequately investigate the adolescent's use of formal operations in solving problems related to identity resolution.

#### 4. Statement of the Research Problem

In the above review of the literature, it is suggested that the use of formal operational thinking and the resolution of the stage of identity vs identity confusion are reciprocally related. Further, it is indicated that, in investigating this relationship, the particular field of content used to measure formal operational thinking should reflect identity related issues.

Ideally, the mutual relationship between the use of formal operational thinking and identity resolution should be studied in a longitudinal research project, which would explore the progression of an individual during the stage

of identity vs identity confusion and his concomitant use of formal operational thinking. Due to the practical difficulties inherent in a longitudinal study, however, a cross-sectional study is proposed.

If the use of formal operations and identity resolution are reciprocally related, it is anticipated that individuals in late adolescence, the most critical period for identity resolution, would be most likely to demonstrate this relationship. Further, in considering the four possible outcomes of the stage of identity vs identity confusion: identity achievement, moratorium, foreclosure, and identity diffusion, it is suggested that individuals in different statuses would vary in their use of formal operational thinking.

Because of their interest and involvement in identity-related issues, and because they have arrived at a positive resolution of the crisis of identity, individuals in the identity achievement status are expected to use formal operational thinking in solving identity-related questions more consistently than individuals in the other identity statuses. Individuals in the moratorium status are also expected to use formal operational thinking in identity-related problems as they, too, are interested and involved in these concerns. The self-consciousness and higher anxiety of these individuals, which has been reported in this review of the literature, however, may interfere with their ability to

consistently rely on autonomous evaluations of these issues. Thus, individuals in the moratorium status are expected to be less effective than individuals in the identity achievement status in their use of formal operational thinking in identity-related issues. Individuals in the foreclosure and identity diffusion statuses, in view of their lack of interest and involvement in identity-related issues, and in view of their failure to positively resolve the crisis of identity, are not expected to consistently use formal operational thinking in solving identity-related problems. It is therefore hypothesized that:

(H1) individuals in the identity achievement status show the greatest ability to use formal operational thinking in solving problems related to identity resolution when compared with individuals in the moratorium, foreclosure, or identity diffusion statuses; and

(H2) individuals in the moratorium status show greater ability than either the individuals in the foreclosure or identity diffusion status in using formal operational thinking in solving problems related to identity resolution.

To investigate the proposed relationship between formal

operational thinking and identity resolution, as a secondary hypothesis, the dependency between the use of formal operational thinking and identity resolution will be tested.

Specifically, it is hypothesized that:

- (H3) the use of formal operational thinking and identity resolution are dependent.

## Chapter 2

### Experimental Design

In this chapter the procedures for testing the research hypotheses are presented. The measuring instruments, selected to measure formal operational thinking and identity status are evaluated. The procedure for the selection and training of judges to rate the identity status interviews is given next. This is followed by a description of the sample and the methods used for data collection. A statement of the plan for statistical analysis of the data concludes the chapter.

#### 1. The Measuring Instruments

##### 1.1 The Watson-Glaser Critical Thinking Appraisal

It is suggested in the Review of the Literature that in order to measure the adolescent's use of formal operational thinking in solving problems related to identity resolution, the content of the measuring instrument should reflect identity issues.

The Watson-Glaser Critical Thinking Appraisal (WGCTA) developed by Watson and Glaser (1964) is proposed as a valid measure of the use of formal operational thinking in solving problems related to identity resolution. The YM form of the test (see Appendix A), which is reported in the test manual to be the more reliable of the two forms of the WGCTA, is

utilized in this study. The validity of the WGCTA as a measure of formal operational thinking will be discussed first and the relation of the test content to identity issues will then be explored. Reliability data for the YM form of the test is given next.

The WGCTA consists of five subtests which, according to the test manual (p. 2), samples an individual's ability to:

1. discriminate among degrees of truth or falsity of inferences drawn from given data;
2. recognize unstated assumptions or presuppositions which are taken for granted in given statements or assertions;
3. reason deductively from given statements or premises, recognize the relation or implication between two propositions, and determine whether what may seem to be an implication or a necessary inference from a given premise is indeed such;
4. weigh evidence and distinguish between:
  - a. generalizations from given data that are not warranted beyond a reasonable doubt;  
and
  - b. generalizations which, although not absolutely certain or necessary, do seem to be warranted beyond a reasonable doubt; and

5. distinguish between arguments which are strong and relevant and those that are weak or irrelevant to a particular question at issue.

Five problem-solving abilities that indicate the use of formal operational structures of the intellect were previously summarized from the literature as the abilities to:

- (A1) isolate and coordinate many variables at one time;
- (A2) conceive multiple possible combinations of the data;
- (A3) consider theoretical mental constructs;
- (A4) test the logical necessity of hypotheses and assumptions not necessarily related to reality or to the individual's belief system; and
- (A5) deduce or infer the logically necessary or best conclusion.

These abilities are used here as criteria to assess the need for formal operational thinking in solving the test items of the WGCTA. In support of this, A. Morf (cited in Bart, 1972) states that:

any problem which demands an individual to reason deductively from a set of hypothetical premises with logical connectives (eg. if...then) is a

formal reasoning item. (p. 664).

Because the subtests of the WGCTA appear to emphasize these five abilities to a different degree, each subtest will be analysed separately.

In subtest one, Inference, individuals are asked to examine inferences (defined as conclusions which persons might make from the stated facts) and to decide if the inference is: definitely true, probably true, probably false, definitely false, or that there is insufficient data to judge one way or the other. To answer correctly, the individual must accept the statement of facts as a true premise of the relations among the variables. He must recognize the inferences as hypotheses which can be tested for logical consistency with the premise, and he must draw a conclusion about the degree of truth or falsity of each. Thus, this subtest appears to emphasize criteria A3, A4, and A5. The individual is not asked to conceive of all possible combinations of the data nor to coordinate variables to explain the relations among the data. The premise given is a meaningful statement of the facts.

Subtest two, Recognition of Assumptions, samples the individual's ability to recognize plausible or implausible assumptions in a given statement. This requires both an understanding of the given statement and an evaluation of whether there is sufficient data in the statement to support

the proposed assumption. In making this decision, the individual must ask whether the proposed assumption can necessarily be taken for granted in the given statement. Hence, criteria A3, A4, and A5 are necessary for answering the items on this subtest. The task in this subtest is somewhat complicated by the subtest's directions that suggest that the assumptions are, at once: "in the statement", "proposed", and "made or not made". The complexity of these directions, together with the format of the items, may create difficulty for some students, and thus possibly create an additional source of measurement error.

Subtest three, Deduction, appears to sample all five abilities which indicate the use of formal operational thinking, thus, it is the most complete measure of formal thinking of the subtests. The given statements or premises must be accepted as true and the variables must be isolated as propositions; criterion A1 and A3. For example, in considering the second item of the subtest (Form YM, p. 5) the individual must recognize two propositions: "Persons who are not superstitious" forms one proposition, and "persons who do not believe in fortunetellers" forms the second. The two propositions must then be coordinated to discover a rule which relates all possible combinations of the propositions; criterion A2. Here the rule is that of logical inference. The logical necessity of

the proposed conclusions must then be tested against this rule to determine which ones "necessarily follow", as stated in the subtest's directions (p. 5).

In subtest four, Interpretation, the individual is asked to judge whether each of the proposed conclusions logically follows beyond a reasonable doubt from the information given (Form YM, p. 6). This subtest is similar to subtest one in that the proposed conclusions must be regarded as hypothetical, and the individual must decide if it can be logically deduced from the given premise. The subtest, thus, also emphasizes criteria A3, A4, and A5. This subtest differs from the first in that the degree of truth or falsity of the conclusion is not asked for. The deduction necessary to answer the question is less specific than in subtest one and therefore would seem to be somewhat easier to make.

Subtest five, Evaluation of Arguments, requires the individual to argue from a point of view which may be different from his own. He must accept the given statement of facts as a true or possible situation and judge how well each proposed argument concurs with the statement of facts. This subtest thus emphasizes criteria A3, A4, and A5 as did subtests one, two, and four.

It may be concluded that the third subtest is the most complete measure of the use of formal operational thinking. Subtests one, two, four, and five emphasize the individual's

ability to test hypothesized relations among the variables. Subtest two is of less value in measuring formal operational thinking because of the complexity of the subtest's directions.

The second consideration for determining the content validity of the WGCTA concerns the relation of the content of the test items to identity issues. According to Erikson (1968, p. 245), individuals in the stage of identity vs identity confusion are particularly concerned about occupational, personal, sexual, political, and religious issues.

The WGCTA involves content that is especially relevant to individuals resolving the identity crisis. The content mainly concerns political, economic and social issues that are of interest to individuals in the United States and Canada, such as freedom of speech, the safety of nuclear power, socialism, equal justice for the poor, women's rights, censorship, etc. The content is described in the test manual (p. 2) as dealing with both "neutral topics" such as scientific facts and topics pertaining to political, economic, and social issues about which many people have definite emotions or biases. Thus, in solving problems of the WGCTA, as in solving problems related to identity issues, the individual must be able to examine the logical necessity of conclusions dealing with content about which he may have previous knowledge and biases. He must set these aside to

demonstrate an ability to use formal operational thinking in considering these questions.

It may be concluded that the WGCTA has content validity as a measure of the ability to use formal operational thinking in problems related to identity resolution. Scores on the third subtest would seem to be the best in sampling this ability. The total score is also a good reflection of an individual's ability to use formal operational thinking, but it emphasizes particularly the individual's ability to evaluate the logical necessity of hypotheses.

As well, there appears to be a developmental trend in the performance scores for the normative groups reported in the test manual (p. 13): see Table 1. These groups were homogeneous relative to their scores on the OTIS Quick-Scoring Mental Ability Test (range 107.1 to 116.7) and showed an increase in mean total raw scores, with age on the WGCTA.

Further support for this analysis of the WGCTA as a measure of formal operational thinking is offered in Guilford's (1967) assessment of the factors of intelligence which are involved in formal operational thinking. According to Guilford (pp. 435-436), with the onset of formal operational thinking, there is an increase in the abilities to use cognitive, divergent and convergent productive, and evaluative operations; on symbolic and semantic content;




Table 1

The Development Trend in Total  
Raw Scores for the YM Form  
of the WGCTA

Normative Sample	Mean Age	Form YM Aggregate Scores		
		<u>n</u>	<u>M</u>	<u>SD</u>
Grade 9	14.10	3,037	57.7	11.0
Grade 10	15.10	2,947	61.7	11.0
Grade 11	16.90	2,406	64.4	11.0
Grade 12	17.9	1,800	65.6	10.9
Liberal Arts Freshmen	--	5,297	70.2	9.8

with products in the form of systems and implications.

Further, Guilford (1967, p. 454) suggests that the WGCTA is strongest for testing the intellectual factor: evaluation of semantic implications.

Watson and Glaser in the test manual (p. 11) also claim (using Guilford's 1956 terminology) to have based their definition of critical thinking on the following factors of the intellect:

1. the cognitive factors of: general reasoning, ability to abstract and generalize, sensitivity to problems and conceptual foresight; and
2. the evaluative factors of logical evaluation, experimental evaluation, and judgement.

Using Guilford's (1967) current terminology, these cognitive factors involve: cognitive and convergent productive operations on semantic content with systems and implications.

The evaluative factors mentioned by Watson and Glaser translate into the new terminology as: evaluative operations on semantic content with systems and implications.

Two factors: divergent productive operations and symbolic content, are included in Guilford's assessment of formal operational thinking and do not appear in the definition of critical thinking used by Watson and Glaser (1964) in the construction of the WGCTA. Referring to symbolic content, it would be less appropriate than semantic

content in measuring formal operational thinking in identity related problems as most identity questions deal with meaningful verbal constructs; that is, semantic content. Concerning the existence of divergent productive operations in the WGCTA, it is suggested by Guilford (1967, p. 215) that the category of divergent productive operations should be applied when deduction deals with daily life information. This is explained by the fact that, in dealing with daily life problems, drawing the necessary conclusion (a convergent productive operation) is rarely possible. With daily life information, drawing the logically possible conclusion (a divergent productive operation) is the usual result of deductive thinking. The content of the WGCTA does deal with daily life information and therefore the category of divergent productive operations applies to this test.

In support of the construct validity of the WGCTA as a measure of formal operational thinking, Ward (1972) reported high levels of correlation between scores on the WGCTA and the Butch and Slim Game of Propositional Logic. The latter is an individually administered test which is based on Piaget's theory of formal operational thinking. It was designed for the Operational Thinking Subscale of the British Intelligence Scale.

Reliability data consisting of odd-even, split-half reliability coefficients, corrected by the Spearman-Brown

Prophecy Formula are given in the WGCTA test manual (p. 13). For the YM form of the test, for individuals in grades nine to twelve ( $n=10,114$ ) in the United States, the reliability coefficient is .86 with a mean raw score of 61.8 and a standard error of 4.3. Reliability coefficients were also reported for grades 9, 10, 11 and 12 separately and ranged from .85 to .87.

### 1.2. Identity Status Interview

The Identity Status Interview and Scoring Manual (see Appendix B) was developed by Marcia (1964, 1966, and 1967). It has been widely used in studying Erikson's psychosocial stage of identity vs identity confusion and appears to be the only instrument available which discriminates among the identity statuses. Other available measures of ego identity, notably Constantinople's (1969) Inventory of Personality Development and Simmons' (1970) Identity Achievement Scale, measure ego identity as a linear quality and do not distinguish among the statuses. The Identity Status Interview, therefore, seems to be the best instrument available to detect the expected differences among the identity statuses. Content, construct, and concurrent validities for the Identity Status Interview and interjudge agreement for rating the interviews have been reported in the literature.

The interview has content validity: As was

noted in Chapter 1, in developing the interview, Marcia operationalized "identity" using criteria congruent with Erikson's theory of identity development: The presence or absence of crisis and commitment in the areas of occupation and ideology (political and religious) were used to define each of the identity statuses.

The construct validity of this instrument is supported by the empirical studies of the identity statuses, which are also reviewed in Chapter 1. It will be recalled that these studies related the identity statuses, in the direction predictable from Erikson's theory, to such variables as: achievement on a stressful concept attainment task (Marcia, 1967); internal and external locus of control (Waterman, C., Buebel, and Waterman, A., 1970); and intimacy status (Orlofsky et al., 1973).

Marcia (1966) studied the concurrent validity of the Identity Status Interview using the Ego-Identity Incomplete Sentence Blank (EI-ISB) to determine an overall ego identity score for each status. The EI-ISB is a 23-item semistructured projective test, also developed by Marcia (1964). It requires the individual to express his real feelings in completing sentence stems that were chosen for their relevance to behaviours that Erikson related to identity achievement. Marcia found that identity achievement individuals obtained significantly higher scores on the EI-ISB than did identity

diffusion individuals. As well, taken together, identity achievement, moratorium and foreclosure individuals obtained significantly higher scores on the EI-ISB than did identity diffusion individuals. The mean score for each identity status was also in the predicted direction (identity achievement: 48.28, moratorium: 48.09, foreclosure: 46.17, diffusion: 43.33).

The concurrent validity of the Identity Status Interview is also supported by a study by Miller (1977). He found a significant relation between Constantinople's Inventory of Personality Development and the Identity Status Interview. Constantinople's instrument is a paper and pencil test, which is based on Erikson's theory of psychosocial development. (Constantinople, 1969).

The initial studies used to validate the Identity Status Interview, all used samples of college males. The validity of the identity statuses for women has been questioned by Marcia (Note 1, pp. 31-34). Erikson's theory is mainly based on his studies of identity development in males. As well, research, using an extended form of the Identity Status Interview (Marcia & Freedman, 1970), suggests a different pattern in the development of identity in women. Because of this, male adolescents only will be considered.

The categorization of individuals into an identity status has been based on the agreement of the ratings of independent

judges. In previous studies, reviewed by Marcia (Note 3, p. 24), the Identity Status Interviews have been recorded on audio-tapes and rated by two or three independent judges. Using the criterion of at least two-thirds agreement among three judges, previous interrator agreements have ranged from 73% to 90%. In one study, using the criteria of unanimous agreement of three judges, an interjudge agreement of 75% was reported. Finally, using the criterion of unanimous agreement of two judges, the agreement ranged from 72% to 90%. The criterion of at least two-thirds agreement of three judges for the classification of an individual into an identity status was chosen for the present study.

## 2. Selection and Training of the Judges

The judges were all females with the degree of Master in Education in School Counselling from the University of Ottawa. These individuals all had knowledge of Erikson's theory and had considerable clinical training and practice in interviewing.

Due to practical restraints, each of the judges was separately trained. Each received copies of the Identity Status Interview with the scoring manual and an article by Marcia (1966), which further elaborated the identity statuses. After familiarizing herself with the scoring criteria, each judge listened to and attempted to classify two to four

sample interviews. These classifications were discussed with the author and attempts were made to ensure a uniform understanding of the criteria for rating the identity statuses.

Each judge listened to all the taped interviews (n = 95) independently (see Appendix C for sample transcripts of two interviews). The judges' identity ratings were recorded on an interview rating sheet (see Appendix D) for the three areas covered in the interview: occupation, religion, and politics, and for an overall or global identity rating. Judges were also asked to include a second choice for each rating whenever possible.

The interjudge agreements for each identity area and for the global identity rating are presented in Table 2. The agreement of at least two out of three judges was 92% in the area of occupation, 88% in the area of religion, 83% in the area of politics, and 87% for the global identity rating. This compares favourably with the results of previous studies. It was felt, however, that the unanimous agreement of the three judges was too low. A meeting was therefore held to attempt to detect reasons for this disagreement. Inconsistency in the interpretation of the criteria for rating the interviews, biases of the judges, and the low interest in the area of politics of the students interviewed emerged as possible sources of the disagreement.

First, the identity statuses appear to be complex

Table 2

Percentage Interjudge Agreement for  
 Unanimous and Partial Agreement  
 of Initial Panel of Three Judges for Rating the Identity Statuses

	Occupation	Religion	Politics	Global
unanimous agreement of three judges based on their first choice	42 %	23 %	22 %	24 %
agreement of three judges based on first choice of two judges and second choice of the third judge	52 %	43 %	33 %	29 %
agreement of at least two out of three judges	92 %	88 %	83 %	87 %

Note. n = 95

categories which require a great deal of inference on the part of the judges. The rating manual was constructed for use with college freshmen and did not seem to be easily generalized to the grade twelve and thirteen students in the present study. The judges appeared to lack consensus in their interpretation of the criteria for the identity status ratings. Notably, their interpretation of "commitment" and "crisis" differed in the degree of commitment or crisis used in the classifications.

Secondly, the biases of the judges also seemed to strongly influence the identity ratings. In particular, one judge, who held the view that few adolescents in this age group could have achieved identity, rated 46% of the interviews in the moratorium status compared with 16% and 19% for the other judges. The judges also tended to categorize in the identity diffusion status, those individuals who expressed a commitment to an unusual religious or political ideology.

Thirdly, the area of political ideology proved, in many instances, to provide little assistance in rating the identity statuses. There appeared to be a general lack of interest on the part of the students interviewed in this area. As many as 33% of these students were rated identity diffusion (uninterested) in the area of politics by two out of three judges as compared to 14% in the area of occupation and 13%

in the area of religion.

In view of these sources of disagreement, the identity ratings of the judges were reevaluated. No agreement among the three judges on the global identity rating of 12 interviews was found. In an additional 33 interviews, although at least two out of three judges agreed on the global rating, there was no agreement on at least one of the ratings in the areas of occupation, religion, or politics. These 45 tapes were reassessed by a panel of three judges comprising the author, a graduate student who assisted in collecting the interviews, and the advisor of this thesis. All interviews were rated independently by these three judges; however, the ratings were discussed following each tape to ensure a uniform interpretation of the criteria for rating the identity statuses. Interjudge agreement for these 45 tapes is reported in Table 3.

Comparing the judges' agreement in Tables 2 and 3, it is observed that the second panel of judges reached a much higher level of agreement. It should be noted that the second sample of interviews (n = 45) were those in which there was disagreement among the first panel of judges. If all the interviews (n = 95) had been reassessed, it is expected that the percentages of judge agreements, displayed in Table 3, would be higher.

The final global identity status ratings for the 12

Table 3

Percentage Interjudge Agreement for  
 Unanimous and Partial Agreement  
 of Second Panel of Three Judges for Rating the Identity Statuses

	Occupation	Religion	Politics	Global
unanimous agreement of three judges based on their first choice	54 %	59 %	32 %	54 %
agreement of three judges based on first choice of two judges and second choice of the third judge	78 %	72 %	65 %	72 %
agreement of at least two out of three judges	96 %	96 %	89 %	98 %

Note. n = 45

interviews, in which there was no initial agreement on the global identity ratings, were based on at least two-thirds agreement of the independent ratings of the second panel of judges. The disagreement among the judges persisted in the case of 3 of the 12 interviews; hence, these were dropped from the study. The final global identity status ratings for the additional 33 interviews were based on the criterion of agreement of four out of the total six judges. Seven interviews did not meet this criterion and were also dropped from the study. See Appendix E for the identity status ratings.

It was also noted that, of the 26 interviews retained, in the case of 13 interviews, the original global identity ratings, which were based on the agreement of at least two out of three of the initial judges, were confirmed; while 13 changed. The changes were from the moratorium status ( $n = 3$ ), or foreclosure status ( $n = 2$ ) to the identity diffusion status; from the identity achievement ( $n = 6$ ) to the moratorium status; or from the identity achievement ( $n = 2$ ) to the foreclosure status. It is possible that these 13 interviews represent individuals in borderline statuses.

In conclusion, it seems that rating the identity statuses is a complex task requiring careful training of the judges. In order to reduce the ambiguities in the interpretational of the rating criteria and to minimize the effects of

the biases of the judges, it is suggested that:

- (1) the judges be trained together;
- (2) sufficient unambiguous sample interviews be heard by the judges in the training sessions to promote a consistent and uniform understanding of the criteria used to rate the interviews; and
- (3) a sufficient number (10 to 20) of the interviews included in the data, be independently rated with the judges together and that these ratings be discussed to arrive at a uniform interpretation of the criteria for judging the identity statuses. Interjudge agreement, based on these interviews, should also be checked at this time.

### 3. Description of the Sample

To estimate the sample size required to detect the expected differences among the statuses, a power analysis, with minimum power of .80 and level of significance  $p < .05$  was conducted. The expected differences were based on the reported differences (Marcia, 1967) in mean time scores obtained by individuals in each identity status on the stressful concept attainment task. The minimum sample size required was estimated to be 20 per identity status. Thus,

a sample of approximately 100 students was sought.

Individuals in the sample ( $n = 96$ ) were English-speaking males in grades twelve ( $n = 5$ ) and thirteen ( $n = 91$ ). They were attending either St. Pius X High School ( $n = 81$ ), which is a private Catholic school, or Fisher Park High School ( $n = 15$ ), which is a nondenominational public school. The average age of the individuals in both schools was 18.63 years (range from 16.5 to 20 years). This age group corresponds to the most critical age group for identity resolution in North American males, 18 to 21 years, as discussed in Chapter 1.

Three of the individuals interviewed were unavailable to take the WGCTA and were dropped from the study. In addition, one foreign exchange student was dropped because it was felt that this student might be at a disadvantage in taking the WGCTA, which is a culture-related test.

#### 4. Procedure for Data Collection

The study was briefly presented in an assembly to all grade thirteen students at St. Pius X High School and a handout entitled, "Instructions to Participants" (see Appendix F) was provided to the students to further describe the study. Those who volunteered to participate were asked to sign for the interview in one of their spare periods between January 10th and 20th, 1978. All of the interviews

were conducted by two interviewers, including the author. The interviews averaged 10 to 20 minutes in length and were conducted in one of two quiet rooms. Because the interviews were tape-recorded, the students were assured of the privacy of the tapes and were informed about the number system for coding the tapes.

The WGCTA was administered in small groups of two to eleven students between January 23rd and February 3rd. As this is a power test, students were given as much time as necessary to complete the test.

Based on the interviewers' tentative categorizations of the interviews, it was felt that more subjects were needed; hence the second school was approached. Data collection at Fisher Park High School took place between February 6th and 10th. All males in grade thirteen and in one grade twelve class were invited to fill out an identity status screening sheet (see Appendix G). Based on this information, and with the assistance of the head of the guidance department of the school, 20 students were asked to participate in the study. Care was taken to include individuals who were anticipated to be in each of the identity statuses to prevent speculation among the students as to a "type" of individual being interviewed.

The study was explained to the 16 students who came to the initial meeting and the "Instructions to Participants"

handout, which had been revised for this school (see Appendix H) was given out. The 14 students who volunteered to participate (mean age 18.64) were interviewed individually in a quiet room. The WGCTA was then written by all 14 students in one group, and again; sufficient time was given for each student to complete the test.

Shortly after all the students had taken the test, the scores for the WGCTA were individually sent to the students together with an interpretation of their results (see Appendix I).

#### 5. Plan for the Statistical Analysis

A one-way analysis of variance ( $p < .05$ ) was planned to detect mean differences among the four identity statuses, using the performance scores on the WGCTA as the dependent variable. The relationship between formal operational thinking and identity resolution was to be investigated using a Chi square statistic. An exploratory analysis, based on the scores on the five subtests of the WGCTA, using multivariate analysis was also planned.

## Chapter 3.

### Presentation and Discussion of Results

In this chapter the analysis of the data used to test the hypothesized relationship between the use of formal operations and identity resolution is presented and discussed. Each of the research hypothesis will be considered in turn. It was hypothesized that:

- (H1) individuals in the identity achievement status show the greatest ability to use formal operational thinking in solving problems related to identity resolution when compared with individuals in the moratorium, foreclosure, or identity diffusion statuses;
- (H2) individuals in the moratorium status show greater ability than either the individuals in the foreclosure or identity diffusion status in using formal operational thinking in solving problems related to identity resolution; and
- (H3) the use of formal operational thinking and identity resolution are dependent.

The descriptive statistics for the aggregate performance scores on the WGCTA for each identity status are presented

in Table 4. The relationship between the use of formal operational thinking and identity status proposed in hypotheses (H1) and (H2) was investigated by means of a one-way analysis of variance, which is summarized in Table 5 and by means of Sheffé post hoc analysis reported in Table 6.

In partial support of hypothesis (H1), the individuals categorized in the identity achievement status obtained a mean aggregate score on the WGCTA that is significantly higher ( $p < .05$ ) than the mean scores of those in either the foreclosure or identity diffusion statuses (see Tables 4 and 6). Contrary to hypothesis (H1), however, the identity achievement individuals did not have a mean aggregate score that was higher than the individuals in the moratorium status. In fact, these results are opposite to the direction predicted with identity achievement individuals scoring lower, although not significantly, than the moratorium individuals. Thus, the hypothesis that individuals in the moratorium status, because of their higher anxiety and self-consciousness, would be less effective than identity achievement individuals in using formal operational thinking to solve identity-related problems was not supported. Four possible explanations for this are proposed: Three of these give theoretical support to the finding that moratorium individuals score as high as those in the identity achievement status, while the fourth suggests that this

Table 4

The Statistics for the Aggregate  
Performance Scores on the WGCTA

identity status	<u>n</u>	<u>M</u>	<u>SD</u>
identity achievement	23	72.48	10.25
moratorium	19	73.63	8.20
foreclosure	18	63.17	8.91
identity diffusion	22	61.64	10.47

Table 5

Summary of the Analysis of Variance for  
the Aggregate Performance Scores on the WGCTA

---

Source	<u>df</u>	<u>MS</u>	<u>F</u>
Among groups	3	790.57	
Within groups	78	91.97	8.60*
Total	81		

---

Note. Value of Hartley's Fmax 1.63, df (4, 22)

\*p < .01      Power > .95

Table 6

Sheffé Simultaneous Confidence Intervals  
for the Aggregate Performance Scores on the WGCTA

Contrast Identification	Contrast Estimates	95% Confidence Intervals
A - M	1.15	-9.67 to 7.36
A - F	9.31	.67 to 17.96*
A - D	10.84	2.65 to 19.04*
M - F	10.46	1.40 to 19.50*
M - D	11.99	3.39 to 20.60*
F - D	1.50	-7.20 to 10.26
A + M - F + D	10.67	4.58 to 16.76*

Note. Identity Achievement (A)  
Moratorium (M)  
Foreclosure (F)  
Diffusion (D)

\* Contrast is distinct from 0

finding should be interpreted with caution.

First, it may be that individuals in the moratorium status did not find the testing situation stressful. The students in the sample volunteered to participate in the study; they were assured of the confidentiality of their results, and the test was not limited by time. As well, the students had met the tester during the interviewing sessions.

Secondly, it is possible that interest and involvement in identity issues is especially strong for individuals in the moratorium status who, by definition, are currently struggling with these issues. Individuals in the identity achievement status, on the other hand, who are committed to a particular career and ideology may be less inclined to consider several points of view in solving a problem than the moratorium individuals.

Thirdly, it is observed that individuals in the moratorium status obtained similar results to those in the identity achievement status with respect to many variables reviewed in Chapter 1. Hence, the findings of no significant difference in the mean scores of the identity achievement and moratorium statuses on the WGCTA is consistent with these previous results.

Fourthly, it is possible that the lower mean scores of the identity achievement individuals is the result of errors

in measurement. Inspection of the raw data (see Appendix E) indicates that there are four identity achievement individuals (numbers: 23, 35, 84, and 86) who have low scores on the WGCTA (52, 54, 57, and 57 respectively). Because their scores are well below the mean score for this status of 72.48, it is suggested that these individuals may be in a borderline identity status or were inaccurately categorized. It is also possible that situational factors or lower intelligence intervened to give rise to their lower results on the WGCTA. Because of these factors, the finding of no significant difference between the mean scores of the identity achievement and moratorium groups should be interpreted cautiously.

Turning to the second hypothesis, the individuals in the moratorium status had a significantly higher mean aggregate score on the WGCTA than either individuals in the foreclosure or identity diffusion status (see Tables 4 and 5). This finding supports hypothesis (H2).

Referring to hypothesis (H3), the dependency of formal operational thinking and identity resolution was tested using a Chi square statistic. As seen in Table 7, individuals scoring above the median score (68) on the WGCTA tended to be in the identity achievement or moratorium identity statuses while those who scored below the median tended to be in the foreclosure or identity diffusion statuses. This supports

Table 7

Contingency Table for Individuals in Each Identity  
Status Scoring Above and Below the Median Score (68)  
on the WGCTA

score on the WGCTA	identity statuses			
	identity achievement	moratorium	foreclosure	identity diffusion
above the median	17	13	6	5
below the median	6	6	11	16

value of Chi Square = 15.03  $p < .01$

value of contingency coefficient = .398

the hypothesis that formal operational thinking and identity status are dependent. Moreover, the contingency coefficient of .398 confirms a moderate relationship between the two variables.

A multivariate analysis of the scores obtained by the individuals in the different identity statuses on the subtests of the WGCTA was planned because the subtests appeared to emphasize different abilities of formal operational thinking. The diversity in what is being measured in the subtests is confirmed by the intercorrelation among the subtests together with the aggregate scores (see Table 8). In particular, subtest two seems to be the most independent; correlations with the other subtests range from .11 to .33. The other intercorrelations among the subtests are moderate, except for a moderately high correlation of .66 between subtests 3 and 4. These intercorrelations are similar to those reported by Watson and Glaser in the test manual (p. 13) for grade ten normative samples ( $n = 2,947$ ). The moderately high correlation between subtests 3 and 4 is greater than that reported by Watson and Glaser, and this difference is difficult to explain.

Despite the diversity in what is being measured in the subtests, however, it is seen in Figure 2 that the mean subtest scores among the identity statuses are proportional to the mean aggregate scores: identity achievement and

Table 8

Matrix of Correlation Estimates for Performance  
Scores for Five Subtests and the Aggregate Scores  
on the WGCTA

Performance Scores	1	2	3	4	5	Aggregate Scores
Subtest 1						
Subtest 2	.23					
Subtest 3	.42	.22				
Subtest 4	.41	.33	.66			
Subtest 5	.44	.11	.45	.35		
Aggregate Scores	.73	.57	.72	.69	.64	

moratorium individuals consistently scored higher than foreclosure and identity diffusion individuals. Because of this consistency, it was felt that multivariate analysis of the data was unnecessary, as the conclusions expected from each subtest would agree with those already obtained for the aggregate score.

The consistency observed in Figure 2 can also be viewed as support for the opinion that the five abilities, which were used as criteria to analyse the WGCTA as a measure of formal operational thinking, develop together.

In view of these results, conclusions which contribute to a clearer understanding of the relationship between the use of formal operational thinking and identity development in male adolescents can now be drawn.

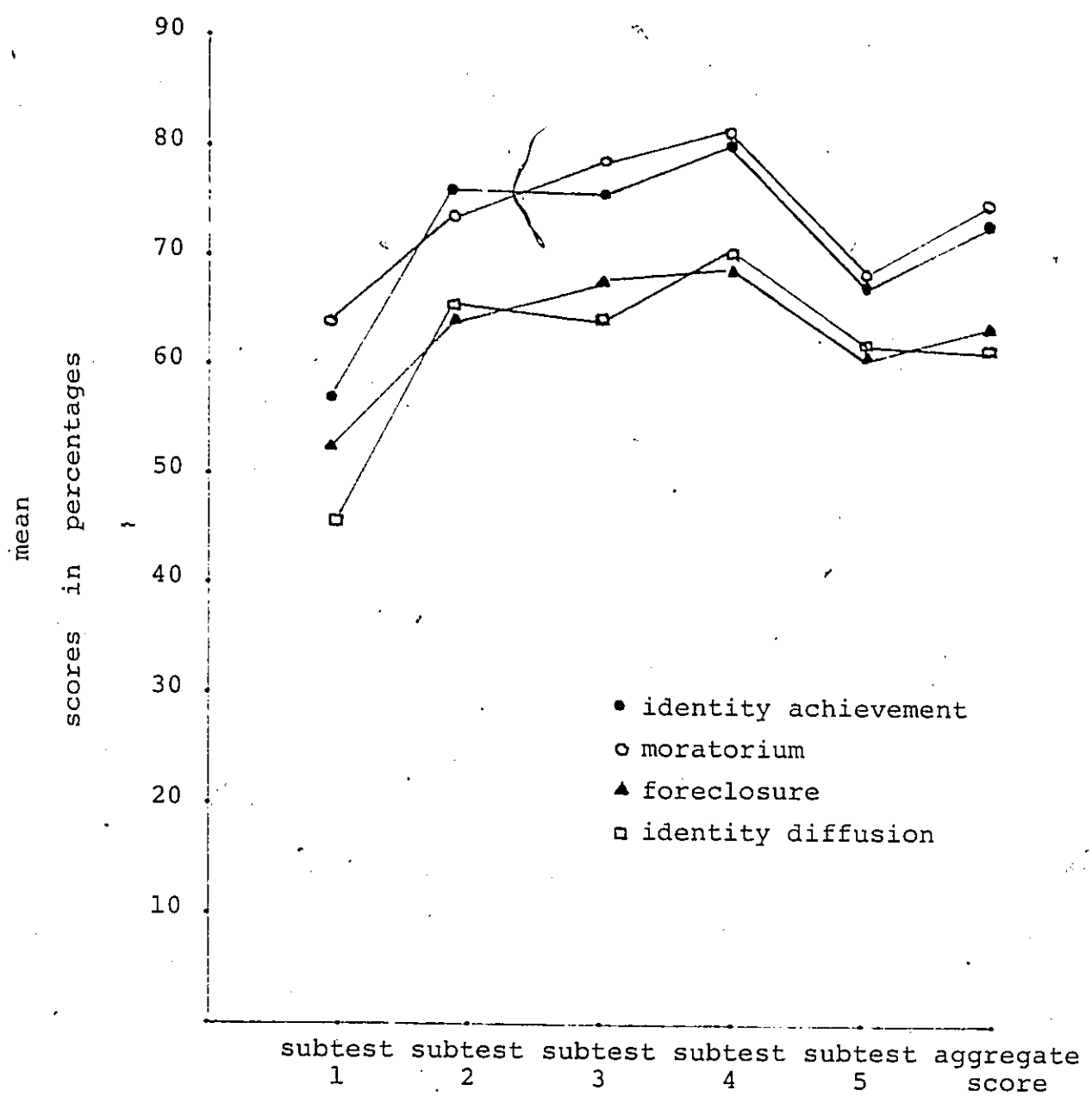


Figure 2. Mean scores in percentages obtained on the five subtests and aggregate score of the WGCTA by individuals in different identity statuses.

### Summary and Conclusions

In this study it has been suggested that there is a reciprocal relationship between Piaget's theory of formal operational thinking and Erikson's view of identity resolution: Those who show aptitude, interest, and involvement in considering identity-related issues use formal operational thinking more consistently in these considerations. As well, their use of formal operational thinking tends to enhance their resolution of this stage of psychosocial development.

The Watson-Glaser Critical Thinking Appraisal (WGCTA) was used as a measure of the use of formal operational thinking in solving problems related to identity resolution, and Marcia's (1966) Identity Status Interview was used to categorize individuals in one of four identity statuses: identity achievement, moratorium, foreclosure, and identity diffusion. The sample comprised 95 grade twelve and thirteen adolescents with a mean age of 18.6 years.

Late adolescents in the identity achievement and moratorium statuses are characterized by their autonomous interest and personal involvement in identity-related issues. These statuses represent the positive polar outcomes of the stage of identity vs identity confusion. In this study, using an analysis of variance, it was shown that the male adolescents in these two statuses obtained higher scores on

the WGCTA, thus showing greater ability to consistently use formal operational thinking in considering identity-related problems than individuals in the foreclosure and identity diffusion statuses. On the other hand, individuals in the foreclosure and identity diffusion statuses, representing the negative polar outcomes of the stage of identity vs identity confusion, are distinguished by their lack of autonomous interest and personal involvement in considering identity-related issues. Adolescents in the foreclosure status tend to accept roles and ideologies prescribed to them, while those in the identity diffusion status tend to avoid confronting identity issues. In this study, the adolescents in these two identity statuses obtained lower scores on the WGCTA, showing less ability to consistently use formal operational thinking in considering identity-related issues than individuals in the identity achievement and moratorium statuses.

Using a Chi square technique, findings of this study also indicated that male adolescents who show an ability to consistently use formal operational thinking in dealing with identity-related issues are more likely to positively resolve the stage of identity vs identity confusion. The relationship between identity development and formal operational thinking in female adolescents has yet to be studied.

Contrary to hypothesis (H1), identity achievement

individuals did not score higher than those in the moratorium status. This raises questions about both the flexibility of identity achievement adolescents in solving problems and the effects of high anxiety on the performance of the moratorium group. It is possible that moratorium individuals do not perform as well as identity achievement individuals only in those situations perceived as stressful.

It is also of concern that individuals in the foreclosure and identity diffusion statuses seem to be caught in a self-perpetuating dilemma: Their lack of interest and involvement in considering identity-related issues influences their consistent use of formal operational thinking in these considerations which, in turn, diminishes their ability to move towards a more positive resolution of the identity crisis. The factors contributing to their lack of interest and involvement need further research. One avenue of research suggested in the identity status interviews, is to investigate the different ways that adolescents are influenced by their families in making identity-related decisions. In the interviews the foreclosure individuals seemed very willing to accept the suggestion of their family or guidance counsellor to pursue a marketable career with little consideration of their own abilities. As well, tapes of the identity diffusion individuals suggest that their parents lacked interest in guiding their offspring in identity-related decisions. It may

also be that the lack of interest and involvement of the foreclosure and identity diffusion individuals in identity-related issues stems from an inadequate resolution of earlier psychosocial stages: Without a trust in their community or an awareness of their own unique potentials, for example, these individuals cannot adequately resolve the crisis of identity.

An additional area for future research is suggested by the practical difficulties encountered in this study in collecting and rating the Identity Status Interviews: A pen and pencil measure of identity status would facilitate future research in this area.

The findings of this study appear to have particular importance for educators and counsellors of adolescents. Erikson (1968) has stressed that a positive resolution of the crisis of identity vs. identity confusion in adolescence is critical for an individual's continued development in adulthood. The results of this study indicate that a factor related to identity resolution is the adolescent's use of formal operational thinking in considering identity-related issues. The adolescent must seriously consider several occupational roles and ideological stances as possible adult commitments in order to choose those commitments that both fulfil his need for self-expression and ensure his recognition as a member of a society. It seems that guidance

counsellors and educators have a role to play in encouraging the adolescent to clarify and consider many alternate occupational roles, religious beliefs, and ideological stances. Opportunities for learning about and exchanging views on these value-laden issues in an atmosphere which does not impose one viewpoint to the exclusion of others, it seems, would enhance the positive resolution of the crisis of identity.

The findings of this study also seem to suggest that temporal and cultural fluctuations in the variety of employment opportunities and ideological beliefs may influence the outcome of the identity crisis. In a culture or era when the adolescent's choice is limited by constraints in the availability and acceptability of occupations and ideologies, it is expected that the achievement of an identity which reflects both personal uniqueness and solidarity with one's society would be more difficult.

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Appendix A

The Watson Glaser Critical Thinking Appraisal

Form YM

PREVIOUSLY COPYRIGHTED MATERIAL  
IN APPENDICES "A" and "B",  
LEAVES 85 ff. NOT MICROFILMED

85 ff - Watson Glaser Critical Thinking Appraisal by Goodwin Watson and  
Edward M. Glaser

MAY BE OBTAINED FROM

Harcourt Brace & World,  
New York, N. Y.

Appendix B - Identity Status Interview and Tapes

MAY BE OBTAINED FROM

J. E. Marcia  
Department of Psychology  
Simon Fraser University  
Burnaby, British Columbia

Appendix C

Transcripts of Two Identity Status Interviews

Appendix C

Transcripts of Two Identity Status Interviews

Interview Number: 16

Interviewer: F. Hawes

Global Identity Status Rating: Identity Achievement

Question (Q): Are you from Ottawa?

Answer (A): Yes I am.

(Q): Are you living at home?

(A): Uhum.

(Q): Did your father go to university?

(A): No, he didn't.

(Q): What does he do now?

(A): He's a manager of men's and boys' wear at Shoe Department for the Hudson Bay Stores in the Ottawa area.

(Q): What about your mother, did she go to university?

(A): She went to teacher's college and she's going to university now part-time. She's a school teacher - special education.

(Q): Let's talk about occupational plans now. You're in Grade 13 now?

(A): Right.

(Q): What do you plan to do next year?

- (A): Either go to Algonquin for law and order enforcement or to Carleton University; the St. Pat's Campus, for criminology.
- (Q): OK, so you're in the area of law in either case?
- (A): Yeah, that's what I'm thinking of right now. Oh, there's other areas too, but those are what I'm looking at just now.
- (Q): Why did you decide on criminology or law and order enforcement?
- (A): Oh, I'm interested in it. I don't know; it looks like a good job. I don't want to be behind a desk all of the time so with the RCMP there is a lot of chance for travel in Canada. Right now, I'm taking a SCUBA diving course which would be useful in the RCMP.
- (Q): You said you have considered other things. What, for example?
- (A): Ah - there's a college in New York - like just across from Toronto - that has a course in underwater occupations - like I've been involved in swimming a long time now. I'm an instructor-guard at the Sportsplex so I'm kinda looking at that and I'm enjoying the SCUBA now so - like they teach you in commercial diving and all that and you work for an oil company or geologist firm or something like that in commercial diving.

(Q): What seems attractive about criminology?

(A): Well, I guess it's just - it doesn't present a boring job - like to me, - like it's so diversified - like with the RCMP - there's so many things you can get into like the crime section - like working up north with different people - like being a diver with them - like it's just not one job you're going to be stuck with - like you can always take different courses with them, move to something else - like work up north for a few years, drug section and that.

(Q): Sounds like you like the excitement there, too - like with the diving.

(A): Yeah, that's part of it - that's like with the diving too - diving! I can see that.

(Q): Most parents have plans for their children, things they'd like them to do. Did yours have anything like that for you?

(A): Uhm. They agree with the law but they always planned on "lawyer" or something like that - I guess they see sort of set roles; but it's not possible with the average I have. It's only about 60.

(Q): How do they feel about your plans then - criminology?

(Q): Uhm. They agree with criminology if I go through with it. They don't want me to just join the RCMP without any university backing and they don't want me taking

the Algonquin course. I think the university just sounds better to them.

(Q): I see. But for you those plans are still open?

(A): It's still up in the air because I'm not sure what the RCMP wants - like the Algonquin course is more practical - like it has rifle range, it has self-defence, it's more practical for police work on the streets and the criminology course is more practical for, well, I guess like being one of their psychologists or something like that - like there's a lot of psychology and sociology courses involved in that course.

(Q): What would be your first choice? - between criminology and law enforcement?

(A): I think I'll take the criminology because it's better for later advancement. To move up it depends on a university degree and that.

(Q): So it depends on getting into the course then?

(A): Yeahhh.

(Q): How willing would you be to change these plans if something better came along?

(A): Something better? Uhm, I guess I would be willing. I can't see anything better just now - not at this time.

(Q): Do you have any particular religious affiliation or preference?

(A): Roman Catholic.

(Q): You're a practicing Catholic eh?

(A): Yes.

(Q): And how does that fit your personal belief system?

(A): I believe most of the things our church does - like there are certain discrepancies - like their birth control beliefs and things like that. I guess I'm more liberal in that sort of thing, but most of the followings - I follow most of the practices of the church.

(Q): What about your parents?

(A): My mother is Catholic - not a strict Catholic. My father is Protestant - he's not religious at all.

(Q): Have you been very active in the church at all?

(A): I was at one time. I'm more active in the school mass than I am in the parish mass.

(Q): Did you ever get into religious discussions?

(A): Yeah, all the time - with my girl friend. She's Protestant and we disagree on a lot of things - and with her parents too. Well, her parents don't like her going out with Catholic guys 'cus they think they don't believe in birth control and, well, she believes in abortion eh - not that she's pregnant or ever has had one but she thinks if she ever got pregnant how it would be her only way out 'cus it

would spoil her plans for university - to be pregnant and so we get into arguments over that all the time.

(Q): How do your parents feel about your beliefs now?

(A): They've come to the point now where with my brothers we're old enough that it's our choice and, well, they don't knock us down for believing Catholic, Protestant, or not believing. They think we're old enough now to know what you believe or what you want to practice.

(Q): Would you say your beliefs differ at all from your parents?

(A): Uhhm, from my dad's maybe - but, well, he doesn't discuss it at all - like he's a good man - he doesn't go to church or anything but that doesn't mean anything about what kind of person you are.

(Q): What about your mother?

(A): From my mom, I think we believe pretty much the same things. She ah - her mother was a really, really strict Catholic - like they went to church every day so she still has some of those ties but now she's gotten away from them more - like her mother died two years ago and it seems that now she's not as religious as she used to be so I don't know if that was just an effect my grandmother had on her and now she's just doing what she wants to do really.

(Q): Was there ever a time when you came to doubt your

religious beliefs?

(A): Doubt my religious beliefs? (yes) Yeah sure, I guess all the time you question what you believe - whether you believe it strongly.

(Q): That's something that happens to you now then?

(A): Uh um.

(Q): Can you give me an example of how this would happen?

(A): Well, I guess because I was brought up Catholic, if someone asked, "Do you believe in God?", you'd automatically say yes, but I think a few years ago, especially around grade 8, I found myself really doubting did I believe in God but now I think - Pius has helped in some ways I guess - I do believe in God now. Just at some times you don't believe as much as you should - or think you should.

(Q): So you did go through a period when you were quite in doubt?

(A): Uh um. Well, there was a couple of years when I didn't believe at all and I didn't care about the Church or religion or anything, but now I think I'm changing - not a fanatic - I'm not a perfect Catholic - but I do believe in the Church and what they say.

(Q): How did you resolve the questions and doubt?

(A): I don't know - it was more resolved for me. When I came here, there was a lot more talk about religion

than at the other school I was at. It was a Catholic school also, but there was no priest there or anything and here we have mass every day and I had some friends that were really involved in the mass and with the prayer meetings here so I slowly came to see it differently.

(Q): So how would you say you are now in that respect?

(A): Uhm, I believe - I'm not involved as heavily as some people are in that respect, uhm, I don't attend all the prayer meetings and everything but I do believe in the Church and I do believe in God.

(Q): OK. Let's have a look at political beliefs. Do you have any political preference?

(A): I guess I'd classify myself as a Liberal.

(Q): What about your parents?

(A): They're Liberal also - in the way they vote - sometimes you might think they're Conservative in the way they think!

(Q): Have you ever taken any political actions?

(A): Well, we were at a pro-life demonstration once that was sponsored by the school and the Catholic Church for the abortion issue. That's about the only thing really.

(Q): Any issues you feel strongly about?

(A): Political issues? Well, I guess the unity issue. I'm

for a unified Canada but not where we're on our knees to Quebec - like I think they're - I think Canada will stay together. I'd like to stay together but not to the point where we're doing everything for Quebec. If it gets to that point, then Canada would be better without them.

(Q): Anything else?

(A): Not really - basically against capital punishment.

(Q): Any time when you decided on your political beliefs?

(A): No, not really. I think political beliefs just come gradually. You might believe in one thing in a political party, in something else you might believe in another. You just have to look at both sides and decide what you believe in.

(Q): Different from your parents?

(A): No. They're about the same I guess.

(Q): What do you think of the upcoming election?

(A): The upcoming election? The federal election you mean? (Yeah) Well, I don't know. I think Trudeau will be back in power again since I don't think the Conservatives are ready for an election. Like Joe Clark - I guess since he first came in he's improved a lot but people don't think he's experienced enough to be P.M. yet. It's his first time in the House of Commons as a minister even. How does he expect to be Prime Minister?

Interview Number: .76  
Interviewer: B. Leadbeater  
Global Identity Status Rating: Identity Diffusion

Question (Q): So! You're in Grade 13?

Answer (A): Yeah.

(Q): Where are you from?

(A): Where was I born? (OK) Well, I was born in Nova Scotia and lived there for about twelve years and then we moved here.

(Q): Are you living at home now?

(A): Yeah.

(Q): How did you happen to come to St Pius X?

(A): Well, I guess it's just that a lot of my friends went there from my old school plus my parents sort of wanted me to go to a Catholic high school too.

(Q): Did your father go to college?

(A): No, he didn't.

(Q): What does he do now?

(A): He's a ... he works with the Canadian Radio and Television Commission. Yeah. He was an announcer right after high school - like he was a disc jockey.

(Q): Did your mother go to college?

(A): She went into nursing.

- (Q): What does she do now?
- (A): She's a nurse.
- (Q): She's working?
- (A): Yeah.
- (Q): What courses are you taking here?
- (A): I'm taking two maths ... relations and calculus, chemistry, biology, English, and geography.
- (Q): What do you plan to do with it?
- (A): I haven't really made up my mind totally yet. I think I'll go to university, probably Queen's, but I'm not sure what I'll go into. I've signed up for Phys Ed - I think that will be good but I'm not positive yet.
- (Q): You're not settled on it?
- (A): No.
- (Q): Are you considering other things besides Phys Ed?
- (A): Sort of ... yeah ... but I don't really know what just yet. I think - I haven't really thought about what I'd really want to do or what I'm really good at. So probably, if not ... I'm sort of thinking of forestry or something like that or architecture ... like it's really open.
- (Q): How are you going about deciding right now or is it something you're really actively doing?
- (A): I'm not, really. I'm just sort of hoping it will

come before the time comes when I really have to decide. You know? I'm staying with Phys Ed - like I'm signed for Phys Ed like I said, and I'm just going to see if I still want to do that or if I want to do something else. I'm not really too worried about that.

(Q): What seems attractive about Phys Ed to you?

(A): Well - like I've been involved in sports all my life and stuff so I thought it would be a way to keep in touch with that - and - ah, it looks like a pretty slack job - like the gym teacher (laughing) I don't know ..

(Q): So you could see yourself being a gym teacher?

(A): Yeah, something like that, or ..

(Q): Would you describe yourself as trying to keep doors open at the moment?

(A): Yeah, exactly.

(Q): You don't want to get tied into anything?

(A): Yeah.

(Q): Most parents have plans for their children, things they want them to do. Did yours express any wishes?

(A): Not at all. Like it's totally my own decision and they'll back me up whatever I want to do I'm sure, but they haven't mentioned a thing.

- (Q): Do you think you'd like a little more advice in that area?
- (A): No, I don't think so. I think it's just nice the way it is ..
- (Q): You think it's your decision?
- (A): Yeah.
- (Q): How do your parents feel about your present plans or lack of plans?
- (A): Well, no opinions really. They just say .. every once in a while they say, "What do you think you'll do next year?" and I said, "I signed up for Phys Ed at Queens," and they said, "Well, that sounds really good -- if that's what you want."
- (Q): Do they realize you're still vacillating, like that you're not really sure?
- (A): Yeah, oh yeah.
- (Q): They understand?
- (A): Yeah.
- (Q): How willing would you be to change from Phys Ed if something better came along?
- (A): Willing!
- (Q): Pretty willing?
- (A): Yeah.
- (Q): What might be better, or what might make it better?
- (A): Ah, I haven't really thought of that. It would just have to come to me all at once, just to say

- "Heck, this isn't what I want to do; I want to do this." I'd want to change then but I can't really say what would make me want to change.

(Q): So you're just waiting for it to come.. (Yeah) and hit you?

(A): Yeah.

(Q): OK. The next questions are on religious beliefs. Do you have any religious affiliation or preference?

(A): No, not really, except that I'm a strong Catholic and I have a lot of faith and stuff like that.

(Q): How about your parents?

(A): They're both Catholic but I think my mother is more strongly than my father.

(Q): Are you active in the church?

(A): Not really!

(Q): You go to church every Sunday?

(A): Yeah, and I go to mass here every day.

(Q): But nothing extra - you're not leading any youth groups or that sort of thing?

(A): No.

(Q): Do you get into religious discussions with your friends or your family?

(A): Like most of my friends - a few of my friends go to prayer meetings .. into all that ..

(Q): The Charismatic movement you mean?

(A): Yeah, like all that. So a lot of times I sort of

- like when they mention it, I laugh at them - not really laugh - like I say, "oh, yeahhh!" and that sort of thing, so in that way we have little discussions like that, but nothing really serious.

(Q): It's a question that interests you, though - like you have something to exchange or you feel you have something to exchange or you feel you have something to learn or talk about with them?

(A): Yeah.

(Q): How do your parents feel about your beliefs now?

(A): (Pause) - I think they're satisfied with the way I am now - with what I believe in.

(Q): Would you say yours are any different from theirs?

(A): No, I think they're pretty much the same, at least as my mother's, ... any my father's, I don't think, as I said, it's not that strong as my mother's, but I think mine are somewhat like my mother's.

(Q): Was there ever a time when you doubted your religious beliefs?

(A): Not really. I guess it just started when I was young - I guess, you know, you learn ... it's sort of been part of me ever since I was young so I guess, well ...

(Q): Would you say it's been getting stronger since then?

(A): (Pause) - yeah, I guess - yeah, I would say so with

so, with Pius and the surroundings here and the mass every day - I think -

(Q): So, in regard to religious issues: How are things for you now - how would you say?

(A): I'm not sure what you mean.

(Q): Are things pretty stable for you now? Like it's not a big issue for you?

(A): Yeah, it's stable.

(Q): You feel quite comfortable with your present beliefs?

(A): Yeah.

(Q): In regard to political questions, do you have any particular political preferences?

(A): No.

(Q): No? How about your parents?

(A): Uhhh - I'm not sure like -- my father is, I guess, he uh .. when we were young - when we lived in Nova Scotia - he ran once - like for the federal election eh, but - hu - I think they both do have pretty strong political parties. Like more than me, eh! 'cus I don't really pay attention to that stuff.

(Q): Have you ever taken any political actions, joined groups, taken part in demonstrations, anything like that?

(A): No.

(Q): Part of the student's council?

- (A): No.
- (Q): Any issues you feel particularly strongly about?
- (A): No, not exactly 'cus I never sort of - well, maybe I should be more knowledgeable about different political parties but I - well ... (some people aren't very interested in politics?) Yeah! I'm not ... I just sort of let it go.
- (Q): What about things like wage and price controls, or, ah, nuclear power - that sort of thing?
- (A): Uh (pause) it just doesn't ...
- (Q): It just doesn't do anything for you?
- (A): No, it doesn't really.
- (Q): ~~What~~ do you think about the upcoming election?
- There will probably be a federal election in the spring or the fall.
- (A): Well, ah ... (That doesn't do anything for you either!) Yeah, like - well ... so there'll be an election and they'll elect - it'll probably be the same, I think, like it has for the past few years - like the Liberals probably will win by about the same - nothing will change much.
- (Q): It doesn't make a whole lot of difference one way or the other?
- (A): No, I don't think so.
- (Q): Do you think you'll vote?
- (A): Oh yeah. I'll vote, yeah, and yeah, I'll have to

ah - before I have to vote I'll know about what I want to vote for - like I won't just go in the way I am now and say well, I'm just going to put a name down. I'm going to know who I want.

(Q): Yeah. So it's something that you really haven't ... like it's never been a demand before but now that you're at the age of voting you might be more interested in it?

(A): Yeah, right.

Appendix D

Identity Status - Interview Rating Sheet

SUBJECT NO. \_\_\_\_\_

IDENTITY STATUS - INTERVIEW RATING SHEET

OCCUPATION: \_\_\_\_\_

RELIGION: \_\_\_\_\_

IDEOLOGY: \_\_\_\_\_

POLITICS: \_\_\_\_\_

IDENTITY STATUS: \_\_\_\_\_

Comments: Use this space for note-taking and demurrers.

Appendix E  
Identity Status Ratings  
and  
Raw Scores for the WGCTA

Appendix E

Identity Status Ratings and Raw Scores for the WGCTA

I.D.	Raw Scores for the WGCTA						Identity Status Ratings*			
	Subtests					Total	Occ	Rel	Pol	Global
1	2	3	4	5						
1	14	2	19	20	11	76	D	M	D	D
2	8	7	17	18	9	59	A	F	F	F
3	9	6	15	16	9	55	F	F	F	F
4	12	12	19	18	10	71	A	F	M	M
5	6	11	19	11	9	56	D	D	D	D
6	15	11	20	22	13	81	M	A	M	M
8	10	15	17	17	7	66	M	F	F	F
9	7	11	18	21	9	66	D	M	D	D
10	11	12	20	22	14	79	D	F	D	D
11	11	13	22	21	9	76	A	F	F	A
12	11	10	12	13	10	56	F	F	F	F
14	13	14	21	21	10	79	M	A	M	M
15	7	6	15	12	11	51	D	F	D	D
16	13	15	23	23	10	84	A	A	A	A
17	11	9	14	15	9	58	M	D	D	D
18	10	13	21	20	10	74	A	A	D	A
19	8	10	18	15	8	59	F	F	F	F
20	13	12	22	19	11	77	A	A	A	A
21	10	6	19	18	13	66	M	M	F	M
22	5	11	12	13	5	46	F	F	F	F
23	8	5	16	16	7	52	A	A	M	A
24	13	15	21	19	9	77	M	A	F	M
26	9	12	19	21	11	72	A	A	D	A
27	11	11	16	14	9	61	M	M	F	M
28	12	3	20	21	9	65	M	M	D	M
29	11	10	23	16	14	74	M	M	D	M
30	8	3	12	15	9	47	M	D	D	D
31	11	12	17	17	9	66	A	A	D	A
33	13	11	19	18	10	71	M	F	D	D
34	8	13	13	15	7	56	D	D	F	D

## Identity Status Ratings and Raw Scores for the WGCTA

I.D.	Raw Scores for the WGCTA					Total	Identity Status Ratings*			
	Subtests 1	2	3	4	5		Occ	Rel	Pol	Global
35	13	3	15	14	9	54	A	A	F	A
36	15	10	24	21	7	77	M	M	A	M
37	16	13	23	23	13	88	M	M	A	M
38	15	12	16	19	10	72	A	F	A	A
39	4	11	23	17	8	63	A	F	F	F
41	8	9	15	15	11	58	M	D	D	D
42	7	13	14	17	8	59	D	D	D	D
43	4	12	14	19	8	57	A	D	D	D
45	7	14	18	18	11	68	M	D	D	D
46	9	12	13	15	7	56	D	D	D	D
61	14	15	20	20	9	78	M	F	D	M
62	13	4	19	11	7	54	D	F	F	F
66	13	16	23	22	11	85	A	A	M	A
67	6	11	12	14	6	49	D	D	D	D
68	18	14	18	22	8	80	A	F	F	F
69	14	13	21	22	13	83	A	A	A	A
70	13	12	11	20	7	63	A	A	F	A
71	11	16	21	20	11	79	A	M	A	A
72	14	10	20	19	14	77	M	A	D	M
73	14	13	17	20	11	75	M	M	D	M
74	14	9	18	20	13	74	A	A	M	A
75	11	13	15	18	12	69	M	F	D	F
76	14	8	22	20	14	78	D	F	D	D
77	11	15	21	23	7	77	A	M	D	M
78	14	13	14	21	12	74	A	F	F	F
79	11	9	17	17	7	61	D	D	D	D
80	9	9	18	15	8	59	D	D	D	D
81	9	13	16	22	12	72	A	A	A	A
82	10	8	15	13	11	57	A	F	F	F
83	12	14	18	16	9	69	A	F	F	F
84	10	12	11	18	6	57	A	M	M	A
85	16	16	23	22	13	90	D	M	M	M
86	10	12	15	15	5	57	A	A	A	A
87	13	13	18	22	9	75	A	A	M	A
89	13	13	18	18	9	71	M	M	M	M

## Identity Status Ratings and Raw Scores for the WGCTA

I.D.	Raw Scores for the WGCTA						Identity Status Ratings*			
	Subtests					Total	Occ	Rel	Pol	Global
1	2	3	4	5						
90	18	15	23	21	10	87	A	A	A	A
91	16	13	23	19	13	84	D	F	D	D
92	13	16	25	21	12	87	A	A	M	A
93	11	12	15	18	8	64	M	M	D	M
94	10	10	15	19	9	63	M	M	M	M
95	12	15	21	18	11	77	A	A	M	A
97	9	11	17	13	9	59	F	F	D	F
98	12	13	14	19	7	65	M	A	M	M
100	9	10	12	17	9	57	F	F	F	F
101	12	11	16	18	7	64	D	D	D	D
102	13	13	20	17	7	70	A	M	D	A
103	12	10	19	16	12	69	F	F	F	F
106	9	13	21	22	12	77	D	F	F	F
107	14	3	23	19	9	68	F	F	F	F
108	5	11	12	13	7	48	M	D	F	D
109	10	9	13	16	7	55	F	D	D	D
110	12	13	20	19	10	74	A	A	A	A

\* Identity Achievement (A)  
 Moratorium (M)  
 Foreclosure (F)  
 Identity Diffusion (D)

Occupation (Occ)  
 Religion (Rel)  
 Politics (Pol)

Appendix F  
Introduction to Participants  
for  
St. Pius X High School

## Appendix F

University of Ottawa

Research Project

### Introduction to Participants


In cooperation with the guidance department and with the permission of the school principal, Father Lunney, a study is planned during the month of January at Pius X High School. The research will be conducted by two graduate students from the Faculty of Education of the University of Ottawa - Frank Hawes and Bonnie Leadbeater.

The study, it is believed, reflects the interest of the guidance department in providing effective and individualized counselling to adolescents. Individuals at this stage of life are faced with decisions about what vocation to pursue and what religious and political ideals seem most relevant to themselves. In this research, the decision-making processes used by adolescents in considering these questions are being studied. This information, it is believed, will assist guidance counsellors in choosing information and approaches which best suit the individual needs of the student.

Due to practical restraints, this research will involve only males, 18-21 years of age in grades 12 and 13. Students who volunteer to participate in the study will be asked to:

1. answer questions in a 20-30 minute individual interview concerning whether or not they have reached a decision on vocational, political, and religious issues, and, as well, what factors went into the decisions. These interviews will take place during spare periods and will be tape-recorded;
2. complete questions on a critical thinking appraisal. This is a 50 minute test which assesses the ability of the student to assess the strength of arguments, detect assumptions underlying arguments and to use deductive thinking. The content deals with topical issues such as freedom of speech, the ethics of scientific research, etc;
3. complete questions on a career development inventory, which takes about 45 minutes. The questions are about school, work and the future career plans of students.

The last two tests will be done with groups of students (as large as possible) during spare periods, at noon hour, and after school if necessary. All scores collected from the tests will be kept confidential. Individual scores will be made available to each student in May.



Appendix G  
Identity Status Screening Sheet

Appendix G

Identity Status Screening Sheet

NAME \_\_\_\_\_ AGE \_\_\_\_\_ HOME FORM \_\_\_\_\_

Mark with an X which one of the following groups of statements best describes you. Please read all of the statements carefully before choosing one.

\_\_\_\_\_ 1. For a time in the past few years, I really didn't know what career I wanted to pursue and I considered a few different careers as possibilities. I now feel my present choice to become a \_\_\_\_\_ (whatever you have decided on) is right for me and I intend to stick with it.


\_\_\_\_\_ 2. I've always been pretty sure I'd like to become a \_\_\_\_\_ (whatever you planned to become). I really have not seen much need in the past to look around at any other careers. This is what I've planned to be and my parents agree it is a good choice for me.

\_\_\_\_\_ 3. I'm not sure what career I'll settle on. I seem to be interested in several different careers just now. I think about what I'd like to do quite a lot but I haven't decided that any one career is just right for me.

4: I'm playing the field just now. Choosing one career isn't that important to me. I want to keep all possibilities open and not get tied down. I'll wait and see what opportunities the future brings.

AFTER CHOOSING ONE OF THE ABOVE, PLEASE USE THE SPACE BELOW OR ON THE BACK TO ADD ANYTHING YOU WISH OR TO QUALIFY YOUR CHOICE.

This information will be used by two students from the University of Ottawa, who are preparing theses for a Masters Degree. A few students will be asked to participate in their study. You will be contacted this week.



Appendix H  
Introduction to Participants  
for  
Fisher Park High School

Appendix H  
University of Ottawa  
Research Project  
Introduction to Participants

In cooperation with the guidance department and with the permission of the school principal, a study is planned during the month of February at Fisher Park High School. The research will be conducted by two graduate students from the Faculty of Education of the University of Ottawa - Frank Hawes and Bonnie Leadbeater.

The study, it is believed, reflects the interest of the guidance department in providing effective and individualized counselling to adolescents. Individuals at this stage of life are faced with decisions about what vocation to pursue and what religious and political ideals seem most relevant to themselves. In this research, the decision-making processes used by adolescents in considering these questions are being studied. This information, it is believed, will assist guidance counsellors in choosing information and approaches which best suit the individual needs of the student.

Due to practical restraints, this research will involve only males, 18-21 years of age in grades 12 and 13. Students who volunteer to participate in the study will be asked to:

1. answer questions in a 10-15 minute individual interview

concerning whether or not they have reached a decision on vocational, political and religious issues, and, as well, what factors went into the decisions. These interviews will take place during spare periods and will be tape-recorded;

2. complete questions on a critical thinking appraisal.

This is a 50 minute test which assesses the ability of the student to assess the strength of arguments, detect assumptions underlying arguments and to use deductive thinking.

The content deals with topical issues such as freedom of speech, the ethics of scientific research, etc.;

3. complete questions on a career development inventory, which takes about 30 minutes. The questions are about school, work and the future career plans of students.

The last two tests will be done in a group at noon hour. Scores on these tests will be returned to you, with a copy to Mr. Charette.

Appendix I

Form used for the Interpretation of the Results  
of the Critical Thinking Questionnaire



## Appendix I

name \_\_\_\_\_ grade \_\_\_\_\_

### RESULTS OF THE CRITICAL THINKING QUESTIONNAIRE

There appear to be many ways in which individuals make decisions about career choices. For some, emotional factors dominate their decisions (eg. what I like best or what interests me most). Others seek out an authority or person who they feel knows them to help with the decision. Still others almost fall into their careers without an active decision on their part. Their philosophy seems to be; "I'll see what the future brings." Finally, some individuals make their decision almost scientifically. This might be called using critical thinking. Although they may not be aware of these precise steps, the individual using critical thinking:

1. sets out the problem (defines factors to be considered in choosing a career)
2. considers many possible career choices (thinks of all the careers he could do)
3. explores information pertinent to each choice (eg. what do people do in the job day to day)
4. makes a conclusion about the best career choice for themselves. (I'm going to be a \_\_\_\_\_).

No one of these methods can be considered the best and

it is likely that most decisions involve a combination of these (and other) methods. How do you make decisions?

Your score on the Critical Thinking Questionnaire reflects your use of critical thinking in considering political, economic, and social issues about which many people have strong emotional feelings and biases. The issues are similar to those which are considered in decisions about career choice and about what political beliefs to hold. Hence, your score may give you some idea about whether or not you tend to use critical thinking in these decisions. Of course, one score alone means very little. You should also consider how you usually make a decision.

Your score is \_\_\_\_\_ out of 100.

Your percentile rank is \_\_\_\_\_. This means that \_\_\_\_\_% of a large number of 18 year old students who took this test in the United States had scores lower than yours. This gives you some idea of how your score compares to other students your age.

Thank you a thousand times for participating in this study and I wish each one of you success in your future plans.