IMPLICATIONS OF EMERGING EPISTEMIC DOUBT
FOR ADOLESCENT IDENTITY FORMATION

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ABSTRACT

This study was undertaken to evaluate the part which nascent
skeptical doubt plays in shaping the course of adolescent social-
cognitive development. Past attempts to relate the achievement of formal
operations to the tasks of identity formation and other signature
concerns of adolescence have yielded equivocal results. This failure is
seen to be due in part to the "all or none" character often ascribed to
formal operational thought. If formal reasoning is seen to be achieved
in one piece, then there is little hope of accounting for the
variability within adolescent development by pointing to such a
monolith. It is argued in this thesis that the intellectual changes
which accompany the acquisition of formal operational competence set in
motion a series of developments which seriously undermine the typical
adolescent's previous sense of epistemic certainty. The epistemic model
proposed in the thesis leads to the hypothesis that, in response to such
doubts, young persons adopt one or another of three contrasting
interpretive levels or strategies each of which then dictates much about
their subsequent solutions to the problems of identity formation and
commitment.

To test these predictions, 110 high school aged young people were
prescreened using a battery of Piagetian measures and classified as
being either concrete or formal operational. Those subjects who were
clearly classifiable (N = 70) were individually administered: (1) Adams'
Objective Measure of Ego identity Status (OM-EIS) which permits
classification of respondents into diffused, foreclosed, moratorium, and
achieved identity statuses; and (2) The Epistemic Doubt Interview, which

is comprised of 2 story problems and a semi-structured interview
procedure, based on the work of Piaget, Perry, and Kitchener and King,
and designed to indicate both the presence of generic doubt and the
respondent's characteristic coping strategy for dealing with such
uncertainties. These include realistic, dogmatic, skeptical, and
rational epistemic stances.

The results indicate that the young people selected on the basis of
the cogntive developmental screening procedures could be reliably and
exhaustively assigned to a single epistemic level or to a modal and a
single developmentally adjacent level. Only formal operational subjects
appreciated the generic nature of the doubt undermining their epistemic
certainty while the concrete operational subjects were largely confined
to the ranks of the epistemic realists. Predictions regarding the
anticipated relation between epistemic stance and ego identity status
were supported. Virtually all of the subjects scored as epistemic
realists were found in the diffusion and foreclosure statuses. Of those
subjects who evidenced an appreciation of the generic nature of doubt,
only epistemic dogmatists were scored as foreclosed. Only subjects
scored as epistemic skeptics or rationalists were routinely found to be
in the moratorium or achieved statuses. The results are taken as strong
support for the claim that epistemic doubt plays a central role in
shaping the course of adolescent social-cognitive development.

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INTRODUCTION

This study was meant: 1) to document an important, but little understood, watershed in the course of adolescent cognitive development that divides the case-specific doubts of middle childhood from the more wholesale generic doubts characteristic of adolescence and adulthood; and 2) to evaluate the part which such emergent skeptical doubts play in shaping the course of the adolescent identity formation process.

In the pages which follow, both a conceptual and an empirical case will be made for the proposition that, with the advent of those cognitive changes that Piaget has characterized as formal operational thought, young persons typically come to a new and more relativised understanding of the relation between ideas and experiences that seriously undermines their earlier belief in the possibility of objective and certain knowledge. This shift in the epistemic posture of adolescents is responsible, it will be argued, for a sequence of new response strategies calculated to allow them to proceed with reasonable certainty and to make commitments in a world where absolute truth is seen as increasingly illusory. To the extent that such a sequence of alternative responses to generic doubt can be documented, room can then be made for the forging of theoretic and empirical linkages between such cognitive advances and other aspects of social and interpersonal development. In particular, it was hypothesized that the various stations of doubt documented here set limits upon the manner in which such young persons are able to advance along the course of the identity formation process.

Accomplishing these interpretive and empirical goals necessitated the administration of a series of cognitive, epistemic, and identity

measures to a sample of junior and senior high school students. The
young persons who made up this sample were initially screened using a
battery of Piagetian measures in an effort to establish their level of
operative competence. Those young persons who could be clearly
classified as either concrete or formal operational were administered
both a semi-structured interview procedure intended to make explicit
their tacit epistemological assumptions, and a standardized
questionnaire measure (Adams, Shea, and Fitch, 1979) intended as a means
of indexing their ego-identity status.

On grounds to be detailed more extensively in the sections to
follow, it was reasoned that both formal operational thought and a
developing appreciation of the constructive character of the knowledge
acquisition process constitute alternative expressions of the same
underlying adolescent cognitive structural shift. Because, however, the
responses of subjects to this loss of simple certainty are hypothesized
to move through a sequence of distinct stages or levels, this
developmental ordering is thought to offer a conceptual bridge linking
cognitive structural advancement with the identity formation process.
Before a description of the procedures and results of this study can be
taken up, however, it will be necessary to first make a conceptual case
for why the course of epistemic development should proceed along the
particular pathway proposed and why such changes should constrain the
course of the identity formation process. This long, but necessary,
frontispiece will consequently detail in turn what is already known
about the course of epistemic development, undertake to relate such
changes to more standard measures of cognitive development, and to set
such changes in conceptual relation to the known course of identity

formation. The remainder of this introductory section will provide an overview of relevant theory and research concerned with these hypothesized cognitive developmental changes, and will preview the conceptual and empirical course that this thesis will attempt to steer.

The central purpose of this thesis, then, is to detail, first conceptually and then empirically, an ordered series of adolescent responses to the prospect of what will be characterized as the emergence of epistemic doubt. The present research effort is not unique in this aim. There currently exist numerous isolated pockets of theory and research concerning the tacit epistemologies of children and adolescents, each of which will be reviewed in detail in sections 1.2 and 1.3 of chapter 1 and used to inform the present conceptual and empirical enterprise. This fragmented literature, which variously focusses upon the epistemic concerns of early childhood, middle childhood, adolescence, and college aged youth, will be shown to be sufficient to guide the present research effort, but does not yet provide any coherent account of the changing nature of young people's epistemic assumptions across the broad sweep of development. The model of epistemic development to be proposed, tested, and conceptually integrated with other more familiar accounts of adolescent development undertakes to divide the manner in which young persons attempt to understand matters of certainty and doubt into three distinct levels or stages. The broad outlines of this proposed model are sketched below.

The Model

All that is known about the nature of the thought in middle childhood, it will be argued, strongly suggests that such young children hold to a realistic set of epistemic assumptions regarding the nature of

knowledge acquisition. As a consequence, such children believe that knowledge is already materially present in the facts of the world and only need to be attended to in order to be known. Any uncertainties or doubts experienced by such young epistemic realists are treated as entirely "case-specific" (Chandler, in press b) and empty of implications for the knowing process more generally for the reason that they are always assumed to give way in the presence of the relevant facts (Boyes, 1982; Chandler and Boyes, 1982; Flavell, Green, and Flavell, 1986; Taylor, 1985; Taylor and Flavell, 1984).

With the advent of adolescence, however, and the increasingly abstract, recursive nature of thought characteristic of formal operational thought (Inhelder and Piaget, 1958), young people are assumed here to begin to call into radical question their earlier realistic assumptions. In their place, according to the present model, adolescents come to be faced with the growing realization that knowledge is the result of a constructive, interpretive, and therefore relativistic knowledge generating process. While much of this is to the good, the dark side of this otherwise powerful interpersonal insight is doubt. Once the inherently subjective nature of knowledge comes to be recognized, the adolescent is assumed here to begin to appreciate for the first time that doubt is no longer the consequence of case-specific ignorance but is instead generic, pervading the entire knowing process (Chandler, in press). With this epistemic shift, all hope of ever attaining absolute knowledge is seriously undermined.

In terms of the model proposed here, three responses are possible in the face of this developing appreciation of the generic nature of doubt. The first and second of these are related in that they both turn

upon the common but flawed assumption (Gadamer, 1975) that regaining

some form of access to absolute truth is a necessary prerequisite to the

formulation of any rational choices. The first, described here as

dogmatism, is premised on the assumption that while, under normal

circumstances, access to absolute truth is denied to most individuals,

it may still be recouped by placing one's faith in some omniscient

authority (either religious or secular) whose access to the truth is not

clouded by ordinary subjectivity (Chandler, 1975). Skepticism, the

second of these two yoked alternatives, is related to dogmatism by the

assumption that absolute certainty remains a necessary component of all

rational beliefs or choices, but differs from other such objectivistic

views in that it denies, in principle, the possibility of ever locating

an unimpeachable source of knowledge. When forced to make choices, such

skeptical young persons, it will be argued, do so for what they

recognize to be arational reasons based upon chance, conformity, or the

like.

A third and final group, refered to here as "rationalists", unlike

their dogmatic and skeptical counterparts, refuse to yoke good reasons

with the necessity of absolute knowledge and decide instead that while

they can never be absolutely sure about anything, it is possible to be

as sure about most things as is typically necessary in order to have the

sort of certain knowledge that knowledge is generally taken to be

(Penelhum, 1967; Shotter, 1984). Standards of rationality which do not

rely on recourse to the absolute unmitigated truth, such as Popper's

notion of falsifiability (1971) or Erikson's notion of commitment

(1968), are tacitly understood by such young persons to be the means by

which competing knowledge claims and good and bad reasons may be sorted out.

This prospect, that young people's understanding of the nature and remediation of doubt may shift during the course of adolescence from realism to dogmatisn and skepticism and finally to a form of post-skeptical rationalism is the orienting assumption in terms of which the scattered literature on adolescent cognitive development will be organized.

The first step in further characterizing this epistemic developmental sequence will be to draw out the parallels between the proposed stages or levels in the management of certainty and doubt and other, better documented markers of cognitive development -- that is, to link the insights gained through focussing upon this darker side of adolescent cognitive development to the well known list of accomplishments of that same structural developmental process.

Once this link has been established, the potential utility in detailing the course of epistemic development needs to be demonstrated by establishing that it permits us to better comprehend other aspects of the adolescent developmental process. While there is a number of adolescent concerns and accomplishments against which the predictive utility and explanatory validity of the proposed epistemic developmental model could be tested, the most compelling area in which to undertake this first test is the study of the adolescent identity formation process, on the grounds that it is widely acknowledged to be the central task of this age period (Borne, 1982a, 1982b; Erikson, 1968; Keniston, 1970; Marcia, 1980). Additionally, and by its very nature, there appears to be a natural affinity between the sorts of troublesome doubts and

uncertainties which, will be shown to arise during the normal course of epistemic development and the questions and doubts which are considered to be central to the task of identity formation.

In order to make good on these claims, several different pieces of this research agenda will need to be set in place. It will first be necessary to provide a conceptual account of the epistemic developmental process. This will be accomplished by first reviewing the small literature which has emerged from the attempts of others to document certain features of adolescent epistemic development (in chapter 1). By collating and elaborating these scattered islands of research it will be possible, at the end of chapter 1, to delineate a descriptive typology of epistemic responses to doubt and uncertainty. This typology will then need to be validated as a first step in the empirical work of the thesis (chapter 2). Only after this proposed sequence of responses to doubt has been demonstrated to appropriately characterize the epistemic orientation of young persons of various ages and levels of cognitive developmental maturity will it be appropriate to ask how this developmental sequence relates to traditional measures of the changing structure of adolescent thought.

In chapter 3, the anticipated age related and structural stage qualities of the proposed epistemic developmental model will be detailed and a series of empirical tests of these hypotheses will be detailed.

If, as assumed, young people's reactions to the prospect of epistemic doubt does in fact constitute the darker side of the _same_ structural developmental changes described more positively within the Piagetian cognitive developmental model, then a specifiable empirical relationship should exist between young persons' performances on

measures derived from each of these areas of understanding. Chapter 2 explores the anticipated relation between standard measures of formal operational reasoning and results obtained from the epistemic interviews collected here. The nature of this relationship is understood to be one of whole-to-part rather than that of cause-to-effect in that both are considered to be alternative expressions of the same underlying cognitive structural whole. Stated in more operational terms, it should be possible to demonstrate that the shift to formal operational modes of thought in adolescence, as measured by standard Piagetian measures, should in every instance be matched by a counterpart recognition of the generic nature of doubt.

Once this anticipated conceptual and empirical isomorphism has been established it will be possible to move on, in chapter 4, to a demonstration of the explanatory and predictive advantages which are expected to follow from a systematic account of the ontogenetic course of young persons' epistemic beliefs. As outlined earlier, it was decided to test these expectations in relation to the process of adolescent ego-identity formation both because such identity issues are of central concern within the adolescent period and because of the natural affinity between such matters and the epistemic issues under study here. As will be further detailed in this section, Marcia's (1966, 1976, 1980) account of the ego-identity formation process stands as the best developed and most thoroughly researched account of this process. Despite the theoretic expectation that a specifiable relation ought to obtain between the shift from concrete to formal operational modes of thought and advancement to higher levels in the ego-identity formation process, past attempts to document the nature and existence of this relation have

been equivocal at best. Chapter 4 outlines reasons as to why the model of epistemic development proposed here should do a better job of predicting young persons' place in the ego-identity formation process and thus provide a stronger, more definitive link between ego-identity development and cognitive structural advancement than have other related attempts. Section 4.2 of chapter 4 draws together the various threads of this conceptual framework and provides a summary of the specific empirical hypotheses generated in chapters 1 to 4.

CHAPTER 1

Epistemological Development

The purpose of this section is to define what is meant by the
notion of one's tacit epistemological assumptions and to provide an
account of how such assumptions can be anticipated to change over the
course of development. It will begin with a review of previously
formulated accounts of the implicit epistemic assumptions present in the
thinking of pre-adolescent children and will turn, later in the section,
to a review of a existing stage models of the course of epistemic
development in adolescence and adulthood. A case will then be made that
these distinct literatures can be stitched together into a more complete
account, drawing out the changing responses of these age groups to
matters of uncertainty and doubt.

The term epistemic understanding, as it will be used here, refers
to one's set of beliefs about the nature of knowledge -- where it is
located, how it is generated, and how it may be attained. Research in
several domains, to be reviewed below, suggests that at various points
in the course of their development young people hold to quite different
assumptions about the nature of knowledge and harbour fundamentally
divergent views regarding the availability of truth and the degree of
certainty which one is entitled to claim for one's beliefs.

In contrast to most other areas of cognitive development,
children's and adolescents' understanding of epistemic issues has been
poorly mapped out and does not so much represent a coherent ontogenetic
account as it resembles a series of disconnected islands of
understanding. The two purposes of this section are then: 1.) to map out
what is already known about these islands and, 2.) once this charting

exercise has been accomplished, to specify a more general model of epistemic development capable of bridging and anchoring them to other important developmental markers.

Epistemic Development in Early Childhood

An active research literature, focussed upon young children's attempts to sort out the differences between what they and others know about the world, indicates that before 4 or 5 years of age children believe all knowledge to be the automatic byproduct of direct sensory experience (Boyes, 1982; Chandler, in press a; Chandler and Boyes, 1982; Flavell, 1986; Flavell, Green, and Flavell, 1986; Olson, in press; Perner, in press; Taylor, 1985; Wellman, in press, 1985; and Wimmer and Hogrefe, in press). For such young children, all knowledge is certain knowledge, equally known by all who share a common perceptual history. According to this literature, this simple "seeing equals knowing" assumption is eventually replaced, in middle childhood, by a growing understanding that appearances may sometimes be misleading and that things are not always as they appear. While continuing to believe that knowledge is directly tied to experience, such young school-aged epistemic realists give evidence of understanding that the knowledge one has sometimes depends upon the particular facet of the world to which one has been exposed. In epistemic terms, this translates to a belief that appearances may differ from, and mask, an underlying but truer reality (Boyes, 1982; Chandler, in press a). While such persistently realistic young persons are not yet capable of appreciating that two persons can be entitled to different readings of the same facts, they do appreciate that not all individuals are equally informed and that this differential access to the truth can produce different interpretations

of one and the same thing. For this reason such middle school aged
children understand that one does not always have grounds for being
completely certain of the correctness of his or her beliefs, though one
may continue to be certain that only one veridical position or
underlying reality exists (Chandler, in press a; Flavell, 1986; Taylor,
1985; Mansfield and Clinchy, 1985). Doubts regarding the veracity of
one's facts, when they are considered at all, are for such children of
this case-specific sort. Discrepancies in beliefs among several people
are deemed to be possible but whenever people hold divergent assumptions
about the same incident or issue one of them, in the long run, must
necessarily prove to be wrong. The truth, while temporarily out of reach
in such situations, must eventually will out.

Changes in children's reactions to those whose beliefs are
discrepant from their own (Enright and Lapsley, 1981; Enright, Lapsley,
Franklin, and Steuck, 1984) mirror this early childhood transition in
epistemic assumptions. Younger, pre-school aged children, who have yet
to appreciate that there is more to knowledge than what meets "the eye,"
either lack any sense of the possibility of disagreement or are
intolerant of any with whom they disagree. The decline in egocentrism
and the counterpart drawing of a distinction between surface or
transient appearances and underlying reality in middle childhood is also
marked by a shift away from such earlier intolerance and moral
denigration of those with whom one disagrees. It is recognized that,
through no necessary fault of their own, people often find themselves in
possession of different beliefs, and as a consequence a more tolerant
and open-minded attitude is often adopted.

Common to most of those researchers who have chosen to focus upon
the early development of the appearance/reality distinction is the claim
that by the early school years, young children appreciate that knowledge
of the world is an interpretive achievement (Flavell, Green, and
Flavell, 1986). Flavell (1986), and others concerned with such
accomplishments (Gopnick and Forguson, 1986; Wellman, 1985; and Wimmer
and Perner, 1983), identify this interpretive insight as being a less
expert version of the same epistemic understanding characteristic of the
average adult. Such accounts of the course of epistemic development are
commensurate with recent characterizations of the general cognitive
developmental course as involving a single qualitative reorganization
triggered in early childhood by the onset of symbolic representational
abilities. Subsequent development, in this view, is a more protracted,
perhaps life-long, process of quantitative change and advancement which
builds upon the basic skills and abilities which accompany the onset of
symbolic representation (Flavell, 1982a, 1982b). The implication of this
view for our understanding of epistemic development is that it leads to
the belief that an appreciation of the appearance-reality distinction in
early childhood and the realistic epistemic stance it supports is the
ultimate epistemic developmental achievement. In the remainder of this
section, a case will be made for the assertion that epistemic
development continues through middle-childhood, adolescence, and into
adulthood and that certain cognitive changes novel to the adolescent
period serve to seriously undermine the sense of realistic certainty
enjoyed during early childhood.

It will be argued, on the basis of past research, that the
increasingly abstract nature of thought, which characterizes adolescent

cognitive development, not only leads to more complex problem solving
strategies and solutions but also to the appreciation of more complex
problems. That is, it is suggested that structural developmental
advances routinely associated with the move into adolescence not only
have a progressive side in that they provide new, more sophisticated,
insight into existing problems and challenges, but they also have a
negative or dark side in that they introduce such young persons to
prospects of epistemic doubts and interpretive confusions not previously
imagined. What will be argued, and subjected to empirical test, is that
in contrast to younger children who are aware that knowledge is
'subjective' in the sense of being relative to the kinds of inputs to
which different people have access, adolescents come to the novel but
disruptive recognition of the relativity of what knowledge is held to
be. The otherwise positive cognitive achievements of adolescence, the
increasing ability to take and coordinate the perspectives of others
(Selman, 1980), the achievement of post-conventional moral reasoning
(Kohlberg, 1971), and even the acquisition of a proper scientific
attitude (Piaget, 1970), may be seen, then, to entail a problematic side
-- that of the potential for serious doubts regarding the whole
foundation of the epistemic enterprise. The upshot of this is to call
into radical question the very possibility of objective knowledge and
warranted certainty. As Mansfield and Clinchy (1985) suggest, one really
only encounters such serious (epistemic) uncertainty beyond childhood.
As will be shown below, however, <u>what</u> is involved in these later
epistemic transitions is clearer than <u>when</u> or <u>how</u> they occur.

A number of theoretic attempts have been made to capture what is
peculiar to adolescents' and young adults' thoughts and assumptions

regarding such epistemic matters, especially as they relate to the issue
of interpretation. It will be argued, in the remainder of this section,
that the foundational feature which is common to these otherwise diverse
approaches is the issue of doubt. What will be proposed is that shifts
in epistemic orientation in adolescence operate to cost young people
their former sense of comfortable certainty about the ultimate
decidability of contrasting knowledge claims. Younger children, while
appreciating that different people may be in possession of different
facts or beliefs about the world, are none-the-less confident that all
interpretive disagreements will eventually be decided with certainty.
Adolescents and young adults, by contrast, are lead by their newly won
cognitive-structural changes to the opposite understanding that some
doubts are unassuagable and that uncertainty regarding the objective
truth of some knowledge claims will simply not go away. The claim to be
tested here is that it is this darker side of what has heretofore been
generally considered to be the positive cognitive achievements of
adolescence -- this realization of the generic or skeptical nature of
doubt -- which informs the sorts of epistemic assumptions unique to
adolescence and adulthood and guides such young people's actions in
situations where knowledge claims conflict.

Epistemology in Adolescence and Adulthood

A number of investigators including Piaget (1929), Perry (1970),
Broughton (1975), and Kitchener and King (1981) have previously
presented descriptions of epistemic changes in adolescence. While it is
not possible to do full justice to their rich accounts, these models
will be discussed in sufficient detail to make clear the point at which
epistemic doubt is understood to enter their respective stage models. An

attempt will then be made to align these various models with the one

being proposed in this thesis.

In his early work, Piaget (1929) began to sketch a psychological

account of a genetic epistemology -- an account of the normal

developmental course of the changing character of young people's

thoughts about the nature and attainability of truth and meaning. On

the basis of early evidence (Piaget, 1929), collected by means of his

familiar "clinical" method, he argued that the general structural

changes which occur in the course of cognitive development are reflected

in a progressive movement through an ordered series of epistemic stages

beginning with a position of absolute realism and moving towards a

stance of subjectivism or relativism (see Appendix A). In his subsequent

work, Piaget (1970) shifted from such a global, epistemic focus to his

better known account of cognitive development defined as movement

towards hypothetico-deductive reasoning or formal operations (Broughton,

1977). The connections between Piaget's early descriptions of epistemic

development and his later accounts of formal operational reasoning are

unclear and indirect at best. Several critics of his work have argued

persuasively that these later attempts (Inhelder and Piaget, 1958) to

directly implicate the achievment of hypothetico-deductive reasoning as

the cause of adolescent self-reflection (Blasi and Hoeffal, 1974) and

the endstate of the epistemic developmental process (Broughton, 1975)

have largely fallen short of the mark. In light of these criticisms, the

possible relations between formal operational competence and epistemic

doubt will be taken up in detail in subsequent sections of this thesis.

In brief, it will be argued here that the same cognitive structural

transformations understood to underpin the movement from concrete to

formal operational modes of thought in adolescence may also be seen to be responsible for the adolescent realization of the the generic nature of doubt.

For the purposes of the present section it is sufficient to note that, in his early writings and based upon his empirical investigation of the early adolescent period, Piaget identified a general movement away from an early commitment to absolute realism and toward a more subjective position in which the knowing process is understood to be importantly constructivistic or person relative.

Operating out of an intellectual tradition remote from that of Piaget, William Perry (1970) began a program of research in the sixties that also led to the development of a systematic model of epistemic and ethical development. Perry's goal was to account for the dramatic intellectual transformations that commonly occur in college students as a consequence of their exposure to a liberal arts curriculum. Perry's model consists of nine positions (see Appendix A for a description). The model is divided into two consecutive developmental sequences. The first describes a five step progression away from an initial dualistic position, in which issues of right and wrong are viewed in black and white terms, and towards a position of relativism, in which knowledge and beliefs are understood to be subjective and person relative. The second developmental sequence follows directly from the first and is comprised of his positions 6 to 9. This second sequence describes subsequent movements away from a position of wholly relativised, know-nothing skeptisism and toward a position described as an affirmation of identity in which one is able to make and justify personal commitments in spite of (or in the face of) what is taken to be the inherently

subjective nature of all knowledge. This last position, according to Perry, involves something like a leap of faith by which one's choices may be supported on other than objectivistic grounds.

In addition to these general developmental trends, Perry described three response styles or ways in which he observed college students to be reacting defensively to the relativistic epistemic position being advanced by those responsible for teaching the liberal arts curriculum in which the students were enrolled. Students who appeared bewildered by their liberal arts experience and who consequently decided to forestall any consideration of epistemic matters were said to be temporizing. Other students are described as retreating from an appreciation of the relativistic nature of knowledge, by actively denying the possible legitimacy of alternate beliefs or truth claims. Finally, Perry characterizes the refusal of some students to move beyond a position of relativism (i.e., position 5) and to even consider the possibility of commitment to be indulging in a form of escape or irresponsible skepticism.

Perry's model is broadly seen to have fused the moral and epistemic realms (Broughton, 1975). This is reflective of his desire to focus, non-evaluatively, on the lived experiences of college students. This approach, which collapses the good and the true, results in an account of development during the college years which straddles both issues of cognitive-structural development and ego-functional development. Consequently, the model is more a descriptive, graded account of college students' reactions to the relativism which they encounter in the course of a liberal arts education than it is a normative model of the ontogenesis of young people's epistemic beliefs.

The embeddedness of Perry's model within the context of a liberal arts experience and its consequent inclusion of functional ego-identity related concerns, has lead to its being employed to inform a series of counseling programs designed specifically to meet the needs of college students (Knefelkamp and Spletza, 1976; Sheese and Radovanovic, 1984; Widick, 1977; Widick, Knefelkamp, and Parker, 1975). This postulated causal connection between college experience and movement away from dualistic epistemic positions has lead to the development of a number of training programs specifically designed to increase the complexity of students' thought (Porier-Heine, 1987; Stephenson and Hunt, 1977; Touchton, Wertheimer, Cornfeld, and Harrison, 1987) Application of this model to other samples has indicated that the beneficial effects of a liberal arts curriculum need not be confined to university but may also be effective with senior high school students (Clinchy, Lief, and Young, 1977).

The third in this series of related models of epistemic development was proposed by Broughton. In ways that are reminiscent of the earlier efforts of both Piaget and Perry, Broughton (1975, 1978) has both outlined an 8 stage account of the ontogenetic course of young people's understanding of the concepts of self and knowledge derived from the work of Baldwin (see Appendix A); and has set this account in relation to Piaget's and Perry's models. This philosophically derived 8 stage model of the ontogenesis of natural notions of epistemology also has been theoretically and empirically related to Piaget's later developed cognitive developmental account of the ontogenesis of logical reasoning and to Kohlberg's theory of moral reasoning development. Broughton's argument (1975, p. 6) that epistemology is necessarily located beyond

logical reasoning and short of moral justification is well taken. In a
similar vein, the present thesis involves an attempt to move beyond
merely positioning epistemic issues between those of logic and morality,
and to tie the roots of the epistemic developmental process more
directly to transformations in cognitive structure believed to underpin
adolescent changes in the nature of thought and beliefs.

The ontogenetic path towards relativism, described in the first
five positions within Perry's model, is similarly traced by Kuhn,
Pennington, and Leadbeater's (1983) account of young adults' changing
understanding of the relations between the subjective and objective
realms of discourse (see Appendix A). Using a methodology after which
the epistemic doubt procedure developed for the present study was
modeled (see section 5.5 in chapter 5), Kuhn et al. presented a sample
of prospective jurors with discrepent accounts of a single, fictitious
event (e.g., The 5th Livian Wars). Their subjects' responses to a series
of probes intended to draw attention to, and elicit explanations of and
contradictions between the two accounts were collected. On the basis of
these responses, Kuhn et al. advanced a 5 level descriptive typology of
reactions to the contradictory accounts of the central event. The
typology ranged from an initial position (Level 0) in which the
discrepant accounts were simply repeated with all sense of contradiction
either omitted or ignored, to a later arriving position of relativism
(Level 4) in which a distinction had been developed and was maintained
between subjective and objective realms of discourse, and, additionally,
it is appreciated that the objective realm is subordinate to, and may
not be addressed independently of, the subjective realm.

In their approach, Kuhn et al. were purposefully less concerned with how their subjects described their epistemic assumptions than they were in illuminating how it is that such assumptions are applied in situations which, by their nature, may be seen to challenge any naively realistic assumption about the ready accessibility of truth or certain knowledge. While this typology was descriptively derived from the responses of a group of adults, it has subsequently been successfully applied to the story responses of a group of grade 6 to 12 students. Kuhn et al. (1983) reported finding all levels of their typology represented within their high school sample. Additionally, they reported a strong relation between age and level, with more senior students more frequently scoring at Level 4. One implication of this result is that if one gauges the nature of young people's epistemic assumptions by how they apply them in situations of epistemic relevance rather than how they characterize their epistemic beliefs when asked about them directly (e.g., as Broughton (1975) did), or when interviewed in a less direct fashion (e.g. as Perry (1970) did) evidence of a relativistic epistemic outlook may be found among younger adolescent populations.

Finally, like Perry (1970), Kitchener and King (1981) also focussed upon the epistemic assumptions of late high school and college aged young people. Unlike Perry, however, who simultaneously considered ethical and epistemic matters, Kitchener and King turned their attention directly to the changing nature of young people's understanding of the belief justification process. Arguing that learning how to discuss and defend ones' own point of view is central to the mission of secondary and post-secondary institutions and thus ought to be an important changing feature of development during adolescence and young adulthood,

Kitchener and King proposed a 7 stage model of the development of reflective judgement concerned with the development of belief justifications (see Appendix A).

Kitchener and King's reflective judgement model is premised upon the developmental assumption that with the sorts of experiences and direct instruction encountered in the routine course of a normal high school and college educational curriculum there is a general increase in the complexity (as defined by Harvey, Hunt, and Schroder, 1961) of the thoughts of such adolescent youths which is reflected in an increasingly sophisticated series of positions (stages) regarding the nature of truth and the attainabiltity of certain knowledge. The model was constructed by drawing upon the previous work of a range of developmental researchers (Arlin, 1975; Broughton, 1975; Gilligan and Murphy, 1979; Kohlberg, 1973; Kuhn, 1979; and Reigel, 1973) and validated by using it to organize the responses of a sample of young people to a series of stories similar to Kuhn et al.'s 5th Livian Wars which contained two contradictory points of view (e.g., creationism vs. evolution; and the effects of food additives). The early stages within the model (1 to 3) reflect a realistic epistemic stance in which it is believed that one may obtain certain knowledge by simply reading objective reality directly, consulting an authority who has already done so, or waiting until the truth is unearthed in the fullness of time. At these early levels, it is possible not only to be right but, with the exception of those cases where the truth has yet to be revealed, it is also possible to be absolutely certain about what is right and about who is telling the truth.

According to this reflective judgment model, with subsequent experience and development these early realistic assumptions begin to falter and are replaced by a dawning sense that objective reality is inaccessable (Stage 4) or that objective knowledge does not exist (Stage 5) either rendering other than entirely idiosyncratic forms of justification impossible or admitting only to specialized, within-content area agreements as to what may stand as appropriate justificatory grounds. Relativism, defined by Perry (1970) and Kuhn, Pennington, and Leadbeater (1983) as the conjunction of a belief that no objective reality exists with a belief that no criteria exist for sorting good claims from bad, is not represented within Kitchener and King's model. Instead, epistemic relativism, as defined in this manner falls between Stage 4, which affirms the existence of an objective reality while denying the existence of any but the most idiosyncratic criteria for evaluating conflicting claims, and Stage 5 which denies the possibility of objective knowledge while affirming that knowledge claims may be justified through the application of domain or perspective relative criteria which go beyond being wholly idiosyncratic, individualistic considerations.

A final two stages complete Kitchener and King's account of the process by which people move out of abject relativism by marking a general expansion of the intended range of applicability of one's principles of inquiry. This expansion moves across content boundaries in Stage 6 and becomes generalized, in Stage 7, into the belief (Dewey, 1915) that inquiry is an ongoing process which, over the course of time, can lead toward probabilistic truths and reasonable certainty in matters

of knowledge as a consequence of the involvement of many investigators in a process of critical inquiry.

Since its development, the Reflective Judgment Interview (RJI) and the 7 stage model of the developmental course of belief justification it references, has received a broad degree of acceptance as a rich, albeit ontogenetically isolated, account of the epistemic developmental course through the college years and into the adulthood. Young persons' stage scores on the RJI have been found to be largely uncorrelated with their scores on Piagetian derived measures of formal operational reasoning, verbal ability, measures of abstract reasoning, and measures of critical thinking (Kitchener and King, 1981; Schmidt and Davison, 1981). This has been taken as an indication that reflective judgment represents a relatively independent aspect of development in adolescence and adulthood.

The theme of college experiences serving as the catalyst for advancements in epistemic complexity, as advanced by Perry, runs strongly through research employing the RJI. Support has been found for the claim that advancement through the stages of the reflective judgment model is directly related to year in college (Schmidt and Davison, 1981; Welfel, 1982; Welfel and Davison, 1986), and that this relation is not due to a confounding of age with educational level as age is found to be only indirectly related to level of reflected judgment (Strange and King, 1981).

The upshot of these various attempts to describe the course of epistemic development through and beyond the adolescent and college years is the suggestion that, in ways only tangentially related to the more general cognitive developmental course but loosely tied to the

sorts of experiences usually had within the curriculum of a liberal arts educational curriculum, the epistemic assumptions of adolescents and young adults become less dualistic or realistic and more relativistic. As the objective foundations for their knowledge are systematically eroded by teachers and others who are 'in' on the inherently subjective nature of knowledge, young people are variously portrayed as begrudgingly accepting a relativised view of knowledge (Kuhn, Pennington, and Leadbeater, 1983) and at best learning to get on with the sorts of commitments necessary to proceed with life in the face of relativism (Perry, 1970), as moving beyond solipsism to some more rational position of idealism, or as dodging the relativistic bullet only by abandoning belief in an objective reality when alternative, non-relative, non-idiosyncratic truth criteria are available (Kitchener and King, 1981).

For the most part, these theoretic accounts of young adults' changing epistemic outlook have had as their philosophically informed goal, the construction of an account of the ontogenetic pathway by which young people and, later, adults move towards a specific teleologic position or endpoint. The nature of this endpoint varies from theory to theory -- relativism for Piaget (1928) and Kuhn, Pennington, and Leadbeater (1983) and, at least in terms of pure epistemic development, for Perry (1970) as well; objective idealism for Broughton; and a Popperian or Dewinian notion of probabalistic truth for Kitchener and King (1981). Such accounts add to a life-span description of epistemic development by charting such epistemic stations as may be encountered throughout adolescence and adulthood. Unfortunately, these same accounts accomplish little in the way of downward ontogenetic linkage between

these more mature epistemic considerations and the earlier recounted

epistemic assumptions evidenced by preschool and early school aged

children. The present thesis is intended to go some distance towards

providing an integrated life-span account of the development of people's

beliefs about the nature and attainability of knowledge by tying the

epistemic assumptions of adolescence more directly to other better

documented cognitive-structural accomplishments.

Central to this attempt to repatriate these ontogenetically diverse

accounts of the epistemic developmental course is a further

consideration of the darker side of the range of otherwise positive

accomplishments of late childhood and adolescence.

CHAPTER 2

Epistemic Uncertainty and Formal Operations

In the previous chapter, a series of alternative characterizations of the epistemic assumptions of young children and of adolescents and adults were reviewed and it was suggested that the emergence of serious epistemic doubt in adolescence serves both to mark a transition from childhood to adolescence and as a conceptual bridge linking existing accounts of epistemic development in adolescence and adulthood. The purpose of the present section is to present an account of how such epistemic development might be related to the course of cognitive development more generally. Specifically, it will be argued in this section that both the onset of epistemic doubt and the achievement of formal operational competence are underpinned by the same structural transformations in thought.

Epistemic doubts, according to the arguments introduced in the preceeding chapter, emerge as one manifestation of still more fundamental cognitive changes thought to reshape the whole of adolescent cognition. These hypothesised transformations are generally understood, within the context of Piagetian theory (Piaget, 1970; Inhelder and Piaget, 1958), to represent major modifications in the deep structure of thought, expressed in and marked by the emergence of particular cognitive accomplishments common to this developmental period.

In order for any given change in adolescent functioning to be understood as a reflection of such hypothesised structural changes, two criteria must be met. First, a compelling conceptual case must be made that the kind of observable changes that are had in mind are in fact changes of the sort which follow directly from the structural

transformations definitional of emergent formal operational competence.
The first part of this chapter is meant to make that conceptual case for
the relation between formal operational thought and skeptical doubt.
Second, any particular change in adolescent functioning which is
promoted as an alternative expression of the general emergence of formal
operational structures of thought must be capable of being shown to be
coextensive with other behavioral manifestations of that same structure.
In the present case, this requires an empirical demonstration that any
measure which purports to document the emergence of skeptical doubt is
highly related to other accepted measures of formal operational thought.
Outlining an empirical means of accomplishing this purpose is the task
of the latter part of the present chapter.

A conceptual case for the relation between formal operational
thought and the emergence of epistemic doubts. If epistemic doubt was
being held out as an expression of concrete rather than formal
operational thought, the empirical case could be made simply by trapping
such doubts in a nomological net woven of the many variables commonly
accepted as equivalent expressions of concrete operational thought.
Through the evolution of a long research tradition, various measures of
conservation, seriation, transitivity, and class inclusion, have all
come to be regarded as interchangable operationalizations of concrete
operations (Elkind, 1974). Certain forms of role taking, empathic
sensitivity, and moral reasoning also have come to be seen as
alternative expressions of concrete operations on similar grounds
(Chandler, 1976, Chandler and Boyes, 1982, Shantz, 1975, 1983).
Unfortunately, much less work has been done in terms of plotting the

various manifestations of those cognitive structures meant to define formal operational thought (Neimark, 1975).

While not nearly so well articulated as the research literature related to earlier arriving concrete operational modes of thought, research into logical reasoning as described by Piaget's account of formal operational thought has expanded rapidly over the past decade (Neimark, 1975, 1979). This increased interest in adolescent cognition seems to have been motivated by two agendas: (1) a basic desire to better understand the nature of and developmental changes in, adolescent cognition per se (Keating, 1980), and (2) a growing dissatisfaction with existing child-centered cognitive development models which are perceived to have little if anything to say about the adult or life-span cognitive developmental course (Commons, Richard, and Armon, 1984). Both of these concerns have lead to an increase in the amount of attention being paid to the developmental course and correlates of adolescent cognition, both as an end in itself and as a point of departure for studying cognitive developmental changes through adulthood.

Since his early work on children's epistemologies, Piaget (1929) and his immediate colleagues came to be concerned almost exclusively with the consequences of formal operations for the development of scientific thought. Consistently, these investigators sought to operationalize formal operations by relying almost exclusively upon measures of hypothetico-deductive reasoning (Inhelder and Piaget, 1958). Despite the importance attached to the emergence of these formal structures, little additional research has been done to link them to their anticipated social consequences. The important work of Kohlberg and his co-workers (Gilligan and Kohlberg, 1971; Kohlberg and Gilligan,

1971; and see Kohlberg, Levine, and Hewer, 1983; and Rest, 1983, for recent reviews), which interprets post-conventional morality as a partial expression of formal operational competency, stands as an isolated exception to this general rule.

In partial response to this shortfall an important piece of the agenda of this thesis is to further explicate the relations between formal operational thought and the development of assumptions about the nature of the knowing process. Stated in the most general of terms, what formal operations will be argued to provide is an opportunity to appreciate that people's beliefs and knowledge are underdetermined by reality as it is in itself. From a very young age children begin to appreciate that persons who share ostensively the same situation are often led to different conclusions. Concrete operational individuals rationalize this fact by laying responsibility for such contrasting knowledge claims at the door of variable informational access. This fundamentally realistic outlook captures what Flavell (in press) identifies as the middle-childhood understanding of both the nature of knowledge and the process of knowledge aquisition as involving the "interpretive" insight that two people's experience of, and therefore their knowledge of, a single event may be different. By contrast, it will be argued here that it is not until the achievement of formal operations during the adolescent period that subjects come for the first time to recognize that people have a personal hand in the knowing process and that the claims they make about the world are not entirely traceable to their different experiences (Chandler and Boyes, 1982; Chandler, in press a). By this account, interpretation comes to be understood by formal operational, but not younger people, to be a

subjective rather than an experiential issue. This is not to say that such newly ordained formal operational thinkers necessarily leap quickly and directly from the ranks of the epistemic realists into the camp of the epistemic relativists. As Swoyer (1982) suggests, arrival at a stance of true relativism in which all knowledge is seen to be irredeemably person, culture, or paradigm relative involves at least a two stage process. The first step, and that which is taken here to be a natural sequella of the shift to formal operational modes of thought, involves the adoption of a constructivistic epistemology in which the knower is seen to somehow organize or constitute what is known. The second step (to be addressed in the next section), according to Swoyer, requires the mounting of a general argument for the proposition that, given their multiplistic view of reality, there is no uniformly correct way of deciding that one of these versions is truer than another.

It will be argued here that these two steps amount to more than arbitrary components of a single conceptual achievement, and represent instead, distinct markers on the developmental path from simple realism to mature relativism. In order to warrant this claim more needs to be said about each of these stages and about how they relate to the overall model of epistemic development being proposed. The first step, which involves the adoption of a constructivistic epistemic stance, carries with it a realization of the generic nature of doubt and is the immediate subject of the present section. The second step, which involves reactions to this realization, will be taken up in chapter 3 below.

Formal operations represents the final stage in Piaget's general account of cognitive development (Piaget, 1970; Inhelder and Piaget,

1958). As has already been indicated, the particular focus of Piaget and

his colleagues has been on the ontogenetic course of logical reasoning.

In light of this, formal operational thought has routinely been

understood to include a constellation of accomplishments centered upon

the new found ability to utilize hypothetico-deductive or propositional

reasoning. Unlike their younger, concrete operational counterparts

whose thoughts are understood to be closely tied to empirical reality, a

signature feature of the thought of formal operational young people is

said to be their ability to delineate the range of logical possibilities

given any set of starting variables. This enables young people's

thoughts to guide, rather than be guided by, empirical investigation.

This ability is understood to derive from the hypothetico-deductive or

scientific reasoning held by Piaget to be the crowning achievement of

development and was seen by him to constitute a definitional feature of

formal operational thought. Consequently, the existence and use of

formal operational reasoning has been held to be indicated by the young

persons' successful performance on such classic Piagetian tasks as the

Chemicals, Pendulum, and Isolation of Variables Tasks (Inhelder and

Piaget, 1958) and, more recently, on measures of scientific and

combinatorial reasoning (Arlin, 1978; Kuhn and Ho, 1977; Kuhn and

Brannock, 1977; Sills and Herron, 1976). The ability to reflectively

consider the propositional contents of one's mind has also been taken to

imply, more broadly, that formal operational young people become

capable, for the first time, of taking their own thoughts as objects of

cognitive contemplation (Elkind, 1974). This ability is held to underpin

what is generally referenced as the adolescent realization of the

subjectivity of matters of personal contemplation. This subjectivity of

perspective has been variously held to be responsible for advancement to post-conventional levels of moral reasoning (Kohlberg, 1976), to lead to more advanced forms of social perspective taking (Selman, 1980), and to "furnish the cognitive and evaluative basis for the assumption of adult roles" (Inhelder and Piaget, 1958, p. 340). While the importance of an appreciation of the subjective nature of one's perspective for many aspects of adolescent social cognition is obvious (Keating, 1980), the link between hypothetico-deductive reasoning and a grasp of the subjectivity of the knowing process is, nevertheless, far from clear and will be returned to below as a current topic of critical debate.

The contention being advanced and set to empirical test in this thesis is that the formal operational reflectivity detailed above carries with it profound epistemological implications which arise as part of the normal course of adolescent cognitive development. In contrast to the hypothetico-deductive reasoning of formal operational adolescents, the reasoning of younger, concrete operational children is described as empirico-inductive or data-driven (Inhelder and Piaget, 1958). In epistemic terms this translates to a distinction between constructivistic epistemological positions on the one hand and thoroughgoing realistic views on the other. The realistic nature of middle-childhood epistemology has been demonstrated by my own and other researchers' work in the area of role taking (Boyes, 1982; Flavell, Green, and Flavell, 1986; Taylor, 1985; Taylor and Flavell, 1984) and by work in the related domain of children's theories of mind (Flavell, in press; Olson, in press; Chandler, in press a). Flavell describes childrens' theory of mind (see section 1.2 in chapter 1) as interpretive in the sense that they include an appreciation that different

experiences may lead to different knowledge about the world. Despite Flavell's (in press) claim to the contrary, this particular understanding of interpretation fails to capture a common adolescent or adult understanding of the nature of the epistemic enterprise. Flavell's definition of the sort of epistemic interpretation found in middle childhood equates it with experience in a manner commensurate with a realistic epistemic position. By contrast, what most adults realize, by way of the reflective insight which is anticipated to routinely accompany the move to formal operational modes of thought in adolescence, is that there is more to interpretation than experience. What such newly arrived formal operational thinkers appreciate instead is that interpretation is not exclusively a post-hoc endeavor and that the distortive lenses that give idiosyncratic meaning to experience are only metaphorically perched on one's nose -- residing, instead, within the organizing framework of one's mind. What this amounts to is the realization that knowledge is a genuine interpretive achievement, that one's epistemological outlook is necessarily constructivistic, and that doubts about the meaning of knowledge claims, when they arise, may not be dismissed as limited or case-specific but have instead more far reaching implications.

While this insight into the potentially generic nature of doubt does not in itself lead adolescents directly to a position of pure epistemic relativism, it does, it will be maintained, put them on the road towards it. By this reasoning, past failures to demonstrate the existence of a reliable relationship between performances on standard measures of formal operations and measures intended to indicate the presence of subjective or relativistic epistemic positions (i.e.,

Kitchener and King, 1981) may be due a mistaken assumption. This potentially erroneous assumption involves the belief that formal operational competence underpins both of Swoyer's (1982) steps toward epistemological relativism: (1) the adoption of a constructivistic epistemology, and (2) the relativistic throwing up of one's hands in the face of the realization that multiple versions of the truth exist. In contrast to such views, the present argument contends that the shift to formal operational modes of thought in adolescence can be held directly responsible only for the first step in Swoyer's two step process of epistemic transition. Consequently, it is hypothesised that the shift to formal operational structures of thought leads directly to a constructivistic epistemic outlook purchased at the cost of skeptical doubt. The second step, which for Swoyer involves the adoption of a relativistic epistemic posture, is understood within the context of the epistemic developmental model currently being proposed to necessarily develop subsequent to the adoption of a constructivistic epistemic stance and to represent one of three alternative reactions to the realization of the generic nature of epistemic uncertainty. The nature and possible developmental ordering of these reactions to generic doubt will be detailed and discussed in chapter 3 below. In what remains of the present section several recent critiques of the use of the concept of formal operational reasoning to account for much of what is taken to be unique to the adolescent period will be addressed. This section will then close with a description of the empirical strategy by which the hypothesised relation between formal operational thought and generic doubt was evaluated.

Despite, or more likely because of, the recent expansion of interest and research into adolescent aspects of cognitive development, precisely what is meant by formal operations is less than clear. Recent critiques of the Piagetian concept of formal operations, narrowly defined as a facility for propositional logic, have been of three sorts. First, the adequacy of Piaget's description of the logical reasoning which defines formal operational competence has been directly challenged as an inappropriate account of the natural reasoning of adolescents and young adults (Braine, 1978; and Ennis, 1976). This critique does not bear directly upon the present concern over adolescents' epistemological positions beyond suggesting that not only is there more to adolescence than formal logic, there is also more to logical reasoning than formal logic. The implications of this critique for measuring formal operations will be taken up below in section 5.4 of chapter 5.

The second type of critique bears more directly upon the issues of concern in this thesis than does the first, in that it targets the most commonly featured component of formal operational thought -- the ability to subordinate the actual to the possible. While Piaget's (1970) contention that within formal operational thought the actual may be considered as a special case of the possible is more easily interpreted in the realm of propositional logic, this same assumption, re-read as an argument in favour of subjectivity, has been assumed to have important social application for role taking (Selman, 1980), person perception (Lively and Bromley, 1973; Boyes and Chandler, 1984), and the process of knowledge acquisition (Chandler and Boyes, 1982). The importance of this notion of subjectivity for conceptually linking such diverse accomplishments as role taking, post-conventional moral reasoning, and

career selection to the achievement of formal operational thought has encouraged the criticism that Piagetian formal operations cannot account for the realization of the subjective nature of experience. This critique amounts to the claim that formal operational thought, narrowly defined as hypothetico-deductive reasoning, is insufficient, or even unnecessary, to account for the many strengths and weaknesses characteristic of the adolescent experience (Broughton, 1977, 1984; Blasi and Hoeffal, 1974). By these lights, it is thought to be inappropriate to charge the formal operational ability to employ hypothetical-deductive reasoning with causal responsibility for any normative aspects of adolescent development given that, by liberal estimates, only 60% of college educated young adults succeed on standard formal operational tasks (Ausubel and Ausubel, 1966; Keating, 1980).

Although certain qualifications are in order, much of the thrust of this critique seems inescapable. Blasi and Hoeffal (1974) convincingly argue that formal reasoning is not a necessary part of the adolescent task of generating and making choices and getting on with one's life. How young people approach such issues may vary, however, and many of these differences depend, it will be argued, upon whether the doubts they experience are of the case-specific or generic variety. The reasons why this is true will be taken up in more detail in chapter 3 in the course of detailing the potential range of young persons' reactions to the realization of the skeptical nature of doubt, and in chapter 4 where the relation between the proposed epistemic developmental model and the identity formation process is discussed.

The second half of Blasi and Hoeffal's critique -- the claim that the reflexive nature of propositional logic is insufficient to account

for the reflective subjectivity, or relativism of adolescence and young adulthood -- is equally compelling but only to the extent that it applies to a view of formal operations as being restricted to the acquisition of propositional reasoning. The implication of Inhelder and Piaget's claim that "there is more to thinking than logic" (1958, p. 335) is that there is more to the adolescent structural reorganization of thought which underpins formal operational modes of thought than propositional logic. As will be elaborated below, the advent of a facility for formal reasoning is but one expression, albeit a well studied expression, of formal operational thought. A central purpose of this thesis is to suggest another such expression in the form of the realization of skeptical doubt and the range of subsequent reactions to this more vexing form of epistemic uncertainty.

A third critique of the supposed hegemony of formal operational thought is related to the second and is premised upon the belief that formal operations, again narrowly defined as propositional reasoning, is an innappropriate endpoint for development. Consistent with this view, a variety of attempts have been made to extend Piaget's account of development into adulthood (Arlin, 1975, 1977, 1984; Basseches, 1984; Riegel, 1973; Sinnott, 1984) or to move beyond Piaget and adopt other theoretic means to describe and account for the course of cognitive development through adulthood (Broughton, 1977, 1984).

All of the forementioned critiques represent valid concerns and it is not intended that this thesis should attempt to refute them. Instead, it is agreed that formal operations cannot stand as the final account of the social cognitive abilities of adolescent young people. The epistemic developmental model proposed in this thesis represents an attempt to add

a piece to the puzzle of our understanding of the development of thought during adolescence and young adulthood. The purpose of this thesis is not then to convergently validate the proposed epistemic developmental model against a series of measures of formal operations but, rather, to demonstrate that the appreciation of skeptical doubt and the achievement of those logical reasoning abilities referred to as formal operations share a common structural origin.

An empirical case for the relation between formal operational thought and the emergence of epistemic doubts. The upshot of the foregoing summary is that any empirical attempt to establish that the emergence of epistemic doubt is in fact an alternative manifestation of the achievement of formal operational structures is constrained and can proceed only by attempting to mount a demonstration that the occurrence of such doubts is coincidental with success on some set of standard Piagetian measures of hypothetico-deductive reasoning. Providing such a demonstration is, then, an important part of this thesis. In order to accomplish this purpose it was necessary to select several measures of hypothetico-deductive reasoning from the range of available tasks (Neimark, 1979). The basis upon which this selection was made is taken up in section 5.4 of chapter 5 below. In addition, a rationale and procedure for detecting the presence of skeptical doubt and gauging young peoples' reaction to it was required. A description of these measurement efforts will be the focus of section 5.5 of chapter 5.

It is necessary to be clear at this point about precisely what kind of a network of empirical relations is anticipated between the measures of formal operations and the measure of skeptical doubt that were

adopted. As described above, formal operational thought is not being held out here as the <u>cause</u> of skeptical doubts, nor is it being suggested that the formal operational stage is a necessary precondition for such doubts. Instead, the measure of skeptical doubt and the other more familiar measures of formal operations to be employed are understood here as alternative means of indexing the self-same underlying cognitive structure. Consequently, it is hypothesised that, within measurement error, any and all subjects who otherwise evidence formal operational competencies will also manifest skeptical doubts, and, by contrast, that any subject who is scored as concrete operational will evidence a persistently realistic epistemology. The measurement strategies employed to test these hypotheses are detailed in sections 5.4 to 5.6 of the methods section (chapter 5).

<u>Summary of Hypotheses and Empirical Issues</u>

As outlined in the preceding section, this study introduces the achievement of skeptical doubt as an important milestone in the course of adolescent development and attempts to substantiate its importance by showing its relevance to the achievement of formal operational competency. To summarize what was discussed in detail above, two key hypotheses may be identified.

1. Adolescence is generally marked by a transition <u>from</u> an earlier set of realistic assumptions <u>to</u> a more relativised constructivistic epistemology which entails a necessary loss of absolute certainty and the emergence of skeptical doubt. This general hypothesis will receive empirical support to the extent that procedures designed to signal the presence or absence of such skeptical doubt discriminate adolescent from pre-adolescent subjects.

2. The preceding age graded hypothesis is understood to be only a rough approximation of a more refined set of expectations to the effect that the emergence of nascent skeptical doubt is in fact an alternative manifestation of the self-same cognitive structures that also mark the appearance of formal operational thought. This assumption will be supported to the extent that measures of skeptical doubt and formal operations prove to be redundant.

How formal operational adolescents who otherwise give evidence of experiencing uncertainties about the ultimate decidability of conflicting knowledge claims will undertake to manage their own epistemic doubts is the subject of the section that immediately follows.

CHAPTER 3

Epistemic Development in Adolescence and Adulthood

Within the present interpretive framework, the abandonment of
realism and the realization of the prospect of generic doubt, along with
the counterpart loss of epistemic innocence it entails, is understood to
be the natural consequence of movement to a formal operational mode of
thought and represent the first step in the proposed model of epistemic
development. The identification of stages prodromal to the sort of
epistemic realism hypothesised here are detailed elsewhere (Boyes, 1982;
Chandler and Boyes, 1982). What remains to be elucidated is the
subsequent nature of epistemic development heralded by the realization
of such generic doubt.

What formal operations have been argued to provide young people
(see chapter 2) is the ability to take the first of Swoyer's (1982)
steps towards relativism; that is, the realization that the knowledge
acquisition process is a constructivistic enterprise. The consequences
of this realization has occupied philosophers and social scientists for
a very long time. Descartes, for example, recognized that to deny that
there are determinate and unambiguous criteria for knowledge leads to
"the dread madness and chaos where nothing is fixed, where we can
neither touch bottom nor support ourselves on the surface" (cited in
Bernstein, 1983, p. 18). Hume, when faced with a similar insight into
the subjectivity of knowledge claimed that he was "ready to reject all
belief and reason and to look upon no opinion ever as more probable or
unlikely that any other" (Hume, reprinted 1938, p. 267). Contemporary
philosophers also identify a similar sort of fundamentally problematic
aspect of knowledge. Feyerabend (1975) speaks of "epistemological

anarchism," MacIntyre (1984) of "metaphysical homelessness," and Douglas (1971) of "the spectre of solipsism." Social scientists have also reflected upon this issue and have referenced it with such descriptors as "the prospect of epistemological loneliness" (Chandler, 1975) and "the vertigo of relativism" (Berger and Luckman, 1967). In addition, other commentators upon the human condition have addressed this same theme and arrived at similar conclusions. Neitzsche (1956) spoke of the "weightlessness of all things" and Kundera (1984) spoke of "the unbearable lightness of being." Clearly something like what Bernstein (1983), in reviewing these and other philosophic statements of this problem, referred to as "Cartesian anxiety" has figured centrally in the thoughts of writers, philosophers, and social scientists alike. In the previous section of this thesis, it was argued, however, that such epistemic doubts are not the exclusive domain of philosophers but represent, instead, a common pitfall in the usual course of cognitive development.

Philosophers over the ages have proposed a variety of solution strategies to the problem of epistemic uncertainty endendered by generic doubts (see Krausz and Meiland, 1982, or Hollis and Lukes, 1982 for an overview). As was previewed in the introduction, these solution strategies tend to be of three general types. These include: (1) The dogmatic belief that while one may lack personal access to truth, experts or special methods exist through which second hand access to certain knowledge may still be attained; (2) The skeptical assumption that no priviledged position or access to objective truth exists and consequently that no rational grounds may be found to warrant the conclusion that one belief or claim is any better or worse than any

other; and (3) Finally, a rationalist position which, while agreeing with the skeptic's assertion that no direct or indirect routes to certain knowledge exist, maintains that such certainty is not a necessary prerequisite to rationally guided action or belief. Commitments redeemed through rational discourse (Perry, 1970; Broughton, 1974), tests of internal consistency and strategies of falsifiability (Kitchener and King, 1981) are among the ways in which one may procede rationally in the face of generic doubt.

Various philosophical arguments have been advanced for why one of these solution strategies ought to be considered superior to other solutions (for reviews see Bernstein, 1983, or Chandler, in press b), and there are no generally accepted grounds for advocating one of these strategies over another. This fact does not preclude the possibility, however, of the existence of a coherent and orderly developmental progression through such epistemic stances, and on such ontogenetic grounds standards for evaluating these alternative prospects are potentially available.

Despite the reactive assumption that epistemic development is promoted by a liberal arts education, researchers such as Perry (1970), Broughton (1974), Kitchener and King (1981), and Kuhn, Pennington, and Leadbeater (1983) have viewed such epistemic development as proceding through an ordered series of stages or assumptions regarding the nature of knowledge. This process is generally understood to begin within a late childhood position of epistemic realism, variously referred to as naive realism (Broughton, 1974), dualism (Perry, 1970), and realism (Kuhn et al., 1983). Development is understood to proceed beyond this level through an initial belief that reality is complex and multi-

faceted but still objectively determined (i.e., objective multiplism (Perry, 1970) or perspectivism (Kuhn et al., 1983)) to a position in which knowledge is viewed as inherently subjective or person relative.

The point at which the course of such epistemic development is taken up in this thesis is that period in late childhood or early adolescence during which knowledge is believed to consist of personally attainable or verifiable facts. According to this realistic epistemic stance, the case for the rationality of one's thoughts or beliefs need not be argumentatively redeemed but rests instead upon an ability to produce the relevant facts. It is into this realistic context that generic doubts, born on the back of one's newly acquired formal operational competencies, are seen to arrive.

One strategy for regaining lost certainty in matters of knowledge, or at least gaining as much certainty as is necessary to procede (Penelhum, 1967, Shotter, 1984), is to adopt new criteria for warranting one's beliefs or knowledge. Such new criteria for rationality would have to be qualitatively distinct from any form of realistically grounded criteria which grant the knower direct access to the confirmatory facts of any matter. The adoption of such rational criteria, whether they involve Perry's (1970) notion of commitment or some variation of Kitchener and King's (1981) criterion of internal consistency and falsifiability, ought to be clearly distinguishable from other more immature and realistically grounded objective truth criteria.

Between these two endpoints of epistemic certainty, one absolute and the other rational, lie the remaining pair of assumptive epistemic positions to be described here -- dogmatism and skepticism. While distinguishable and even oppositional on many grounds, these alternative

views are, as Gadamer (1975) has pointed out, indistinguishable with regards to what they hold to be the necessary criteria for rationality. Both share the common assumption that some form of access to certain knowledge is an essential component of any claim for rationality (Bernstein, 1983). The implication of this common foundational belief is that it disallows all those who share it any hope of personally satisfying their own criteria for rationally guided thought or belief. In each case personal access to undoubtable knowledge is simultaneously seen as necessary and unavailable. The epistemic assumptions of dogmatists and skeptics differ, however, in the course of action each recommends. Faced with the loss of personal criteria for rationality one may attempt, by adopting a dogmatic stance, to regain a sense of lost certainty by slavishly adhering to the dictates of some external expert or expert-derived method. In sharp contrast to this reliance upon borrowed truths, one can opt instead to take a skeptical turn and despair of the prospect of ever identifying realistically derived criteria for rationality. Believing that they lack the grounds upon which to make defensibly rational choices, such skeptics, when forced by circumstance into some decision, make the choices they do on explicitly non-rational grounds such as impulsivism (acting without thought), intuitionism (doing what affect demands), conformism (doing the done thing), or indifferentism (tossing a coin).

While it follows from what has been said so far that realism and rationalism ought to be ontologically distinct, both from one another and from the axis of dogmatism and skepticism that divides them, the same cannot be said about these intervening alternatives. Because of their shared commitment to the notion that acceptable levels of

certainty require knowledge that is beyond doubt, it is not immediately apparent whether these otherwise contrasting views constitute a single epistemic position or follow one another in some fixed order.

The provisional answer to this question to be adopted in the present study is that dogmatic views precede rather than follow or occur simultaneously with their skeptical counterparts. The grounds upon which this tentative claim rests have to do with the affinity between these alternative views and the epistemic postures out of which they emerge and toward which they seem driven. Because dogmatists rely on the dictates or methods provided for them by external authorities they appear on these grounds to be more similar to their younger realistic counterparts than to other more fully rational adolescents or adults. In contrast to both of these groups, skeptics have more clearly moved beyond their earlier realistic dependence on objective criteria for truth and have taken a necessary step towards a more rational epistemic stance. On these grounds, dogmatism can be regarded as less mature than, even if in some ways structurally equivalent to, the skeptical positions with which it shares certain primitive assumptions.

The provisional developmental ordering of dogmatism and skepticism outlined above suggests that young people initially respond to the prospect of uncertainty by trying to salvage what is left of absolute veracity through dogmatically placing their faith in the dictates of experts. Once commited to this course, something like the skeptics' wholesale collapse of certain knowledge would appear to be a necessary prerequisite to the subsequent formulation of any rational epistemic stance in which good reasons replace objective truth as the proper criteria for warranting one's beliefs. What this suggests is a potential

multilinear path to mature forms of rationality. One could either move directly from a realistic epistemic stance through an intervening skeptical position enroute to an eventual rational posture or, in a last ditch effort to salvage absolutism, one may take a detour into dogmatism. In either case, by the present account one must eventually pass through a period of skepticism before the option of a rational position becomes viable.

Ultimately, empirical confirmation of this proposed developmental sequence will require a longitudinal analysis that successfully traces the course of epistemic development in single subjects from a starting position in naive realism, through a disruptive episode of skepticism (with or without the frequent detour into dogmatism), to the eventual adoption of more rational views. A necessary first step in this analytic process, and the one adopted in this thesis, is to delay such a longitudinal analysis until there is sufficient cross-sectional support for the ideas being proposed to warrant pursuing them further. Most conventionally, such an approach would require establishing a rough connection between age and changing epistemic posture. A more telling and theoretically rich analysis, however, requires a demonstration that the process of epistemic development being proposed is shepherded by conceptually related changes in the course of cognitive development more generally. As was argued in the previous section, the onset of formal operational thought is assumed here to be reflective of the same cognitive structural changes that initially open young people to the prospect of generic doubt. This line of reasoning leads to the testable expectation that before acquiring formal operational competence all young people will be epistemic realists and conversely, that all persons

capable of formal operational reasoning will be locatable somewhere along a dimension that runs from an axis of skepticism and dogmatism to an eventual position of post-skeptical rationalism. Once this general prediction has been tested, subjects' responses will be examined in an effort to determine the extent to which their reactions to doubt and uncertainty further conform to the stage model being proposed. In what remains of this section, the criteria for evaluating adherence to such a strict stage model will be described, and the empirical means by which the proposed epistemic model's adherence to these criteria were evaluated will be detailed.

In brief, any developmental account that aspires to qualify as a strong stage model needs to conform to what are described below as the structure criterion, the sequence criterion, and the hierarchy criterion (Piaget, 1960, Kohlberg, Levine, and Hewer, 1983).

The structure criterion holds that each stage in a proposed stage sequence constitutes a holistic structure. Translated into empirical terms this criteria demands that people be internally consistent in the stage to which their responses are assigned across varying contents and contexts. Somewhat liberalized, this same criterion holds that when all of an individual's responses are not at a single stage they will always be found at adjoining stages (presumably such individuals are in transition to the next higher stage). What this translates into is the expectation, based on the structure criterion, that the majority of a subject's claims about epistemic issues ought to be at the subject's modal epistemic stage with a lesser amount, if any, at the next higher or next lower stage. Substantial numbers of subjects whose responses were spread over two stages or any appreciable number of responses

spread over more than two stages would count as evidence against the model fulfilling this structure criterion.

The sequence criterion holds that within any developmental sequence which conforms to the standards of a strong stage model, the stages will be attained in an invariant order and that development is always to the next higher level. This amounts to the related requirements that there be no regression or skipping of stages and, while experience may affect the rate of stage attainment, it should not affect the order of attainment. A complete evaluation of any stage model's adherence to this criterion obviously requires repeated testing of the same subjects. Following the same subjects over time is absolutely necessary to check for the presence of regressions in epistemic stage. Experimental efforts in which short test-retest intervals are interspersed with instruction, counterarguments, or other inducements to move to higher stages are necessary to test for the presence of stage skipping. Such strong tests of the sequence criterion are not possible within the present cross-sectional design and thus, in the present study, any support for the proposed epistemic stage model having adequately satisfied the sequence criterion will, of necessity, be indirect.

The appropriateness of holding the epistemic stage model to the no-regression component of the sequence criterion would certainly be called into serious question by philosophers who would tolerate no predetermined constraint upon their attempts to convert others to their own favoured epistemological position, be it realistic, dogmatic, skeptical, or rational. Disallowing regression within the epistemic stage model amounts to setting a constraint of this sort. Structural theories of development such as Piaget's theory of cognitive

development (Piaget, 1970) or Kohlberg's theory of moral reasoning development (Kohlberg, Levine, and Hewer, 1983) do, however, anticipate no such general regression to previously attained stages. From within these developmental perspectives, each successive stage is understood to subsume and hierarchically integrate the preceding stage (see the hierarchy criterion below). People scored at advanced levels within these structural stage models of development may occasionally give responses characteristic of earlier stages but such responses are understood to represent variations in performance and not underlying structural competence. What is not yet clear is whether the epistemic stage model under consideration is comprised of stages of this strong sort, or whether the stages conform to some weaker pattern through which a normative but neither necessary nor irreversible course is steered during adolescence and young adulthood (Noam, 1980; Noam, Kohlberg, and Snarey, 1983).

The foregoing conceptual analysis of the range of alternative responses to the realization of the generic nature of doubt suggests that, while other issues remain unsettled, at least the order in which epistemic stances, beyond realism, are initially achieved is constrained. In moving from a position of realism towards one of rationalism it is assumed here to be unlikely that the idea of an objectively grounded theory of knowledge will be discarded at the first indication that all doubts are not case-specific. For this reason, a full skeptical acceptance of the subjective character of knowledge should routinely follow rather than proceed dogmatic attempts to shore up the failing objectivistic enterprise. Finally, it is only after the dogmatic prospect of regaining access to certain knowledge has been

skeptically dismissed that non-objectively grounded, rational epistemologies are seen to be both needed and possible.

Establishment of this developmental ordering in this and future empirical efforts would strengthen the present claim that this model of adolescent epistemic stage development constitutes a strong rather than a weak stage model. The expectation regarding this and other structural developmental models is that the <u>direction</u>, but not the <u>endpoint</u>, of development is fixed. By these lights, while upward movement through the stages should be related to age, no specific prediction may be advanced about where the majority of young people at a given grade level will be found.

Counting against this interpretation, however, is the possibility that movement between dogmatic and skeptical epistemic positions may be bi-directional. That is, people who had given up hope of personally finding objective truth, while still believing that such truths are needed for making rationally guided choices, may alternatively discover and then skeptically reject a whole series of experts, gurus, or methods temporarily imagined to offer access to the objective facts. This possibility will be returned to again in chapter 6 and discussed in light of results regarding the relationship between epistemic stage and ego-identity status.

Despite these caveats, it is anticipated that movement through the epistemic stages will occur in the anticipated order and direction and be evidenced in the present cross-sectional study by a greater incidence of the more advanced stages of skepticism and rationalism among the senior as opposed to the junior grade levels. The final designation of

the epistemic stage model as "weak" or "strong" in the sense detailed above awaits further, longitudinal, investigation.

The hierarchy criterion addresses the extent to which each stage represents a hierarchical integration of previous stages. This criterion is based on the understanding that each stage is not attained at the expense of the preceding stage but rather includes or subsumes it. Within the present epistemic stage model, dogmatism, for example, in contrast to realism, includes an appreciation that there is often more to our thoughts than simple cumulative experiences. Skepticism adds to this dogmatic understanding the appreciation that not only do persons intentionally manipulate facts but that all knowledge is inherently and unavoidably shaped by the perspectives of those who employ it. Similarly, rationalism does not reject, but rather moves beyond the insights of skepticism. On these conceptual grounds, then, some case can be made that the proposed model does conform to the hierarchy criterion.

Included within this hierarchy criterion is the further contention that people will recognize the increased adequacy of each successive epistemic stage but will not lose the ability to recognize or employ lower level epistemic ideas or assumptions. The most direct test of this possibility involves requiring subjects to select, from pairs of statements, the one they take to be more adequate (Walker, de Vries, and Bichard, 1984; Kurfiss, 1977). Short of this sort of a direct test, some indirect evidence, more conceptual than empirical, will be examined (in section 6.2 of chapter 6) in the context of the present study in order to determine whether the hypothesis that the proposed epistemic stage model conforms, at least indirectly, to the constraints of the hierarchy criterion.

The extent to which the epistemic stage model conforms to these several criteria as observed in the responses of a sample of high-school students to a series of measures will be evaluated below in section 6.2 of chapter 6.

Summary of Hypotheses and Empirical Issues

The nature of the relation anticipated to obtain between epistemic doubt and formal operations has been detailed in an earlier section. The present section sought to sketch out the course of epistemic development beyond naive realism and to identify the criteria and means by which it might be verified empirically. The following hypotheses summarize the results of this conceptual effort.

Formal operational adolescents who otherwise give evidence of experiencing uncertainties about the ultimate decidability of conflicting knowledge claims will undertake to manage their own skeptical doubts by adopting response strategies referred to here as: dogmatic, skeptical, and rational. This hypothesis requires, as a precondition of its support, that subject responses to the measure of skeptical doubt be reliably and exhaustively coded as falling into one of these three response modes.

If this condition is met it will then be possible to examine, in a provisional cross-sectional manner, the extent to which these three distinct response modes represent levels within a specifiable ontogenetically ordered model of epistemic development. To this end, the extent to which the proposed model adheres to the criteria for a strict stage model (i.e., the structure, sequence, and hierarchy criteria) will be evaluated.

In the sections which follow, the nature of the relationships that are anticipated between the epistemic stage model and measures of other aspects of social cognitive development will be detailed and empirically evaluated.

CHAPTER 4

Epistemic Doubt and Ego-Identity Status

The question to be addressed in this section is the likely bearing

which epistemic doubt has upon the process of adolescent identity

formation. As Erikson (1959, 1968), and a host of others (Coleman,

Herzberg, and Morris, 1977; Crook, 1980; Douvan and Adelson, 1966;

Josselson, 1980; Marcia, 1980; Matteson, 1972; Newman and Newman, 1978;

Slugoski, Marcia, and Koopman, 1984; and Waterman, 1982) have argued,

the central task of the adolescent period is to orient one's self to the

range of commitments that impending adulthood demands. In our present

time and culture, children are usually excused from the task of making

serious occupational and ideological commitments and are not expected to

form new, lasting intimate relations (Baumeister and Tice, in press;

Elder, 1980; Keniston, 1970; and Weigert, 1983). While this moratorium

is also seen to partially extend into the adolescent period, such young

persons are typically seen to occupy an important staging ground between

middle childhood and maturity, and are expected to make serious moves in

the direction of framing such enduring commitments (Marcia, 1966, 1976,

1980). It is this obligation which is generally seen to be responsible

for the fact that adolescence is often a period of turmoil (Erikson,

1968). If others did not hold out such expectations for them, and if

adolescents did not share in these expectations, then, presumably, much

that is stressful about the adolescent period would cease to be

operative.

The paradox which confronts young adolescents is that such demands

for serious commitments escalate at precisely that developmental point

at which they first acquire the cognitive competence to begin to call

into serious question their right to be certain about anything at all. From the present perspective then, the familiar identity crisis of adolescence can be seen as the joint consequence of mounting societal pressures on the one hand, and a growing sense of lost certainty on the other.

Assuming for the moment that such societal pressure can be treated as a kind of socio-historical constant, it follows that the individual differences commonly observed in the ways which adolescents attempt to solve the problem of their own identity may be shown to vary as a function of how they respond to the more internally generated problem of mounting skeptical doubt. While the earlier account of the likely responses of adolescents to such growing doubts was couched in terms of their anticipated responses to the problem of conflicting knowledge claims more generally, there are good reasons to assume that young persons will also employ these same response strategies when attempting to cope with uncertainties about their own future life course. On these grounds, it can be anticipated that when adolescents consider the mounting demands to formulate serious life commitments they will respond as they do more generally, by either sinking further into skeptical doubt, retreating into the arms of dogmatism, or forging ahead with some rational strategy for choosing among the uncertain prospects at their disposal.

For the reasons just articulated, it should follow that when adolescents are questioned about matters having to do with their ideological commitments, occupational goals, or relational choices, they should respond in ways which are consistent with their orientations toward unsettled questions more generally. On these grounds, it is

hypothesized that young adolescents who have not abandoned their earlier

realistic orientation in favour of the constructivistic assumptions

associated with formal operational thought should continue to be

insulated against the prospects of identity crisis. Such individuals

should continue to presume that all questions concerning what they

should be or believe are matters of absolute fact which will be

unambiguously settled as soon as all the relevant evidence is in. On

similar conceptual grounds, it may also be anticipated that those

adolescents who have in fact reached a level of formal operational

competence, but who have not as yet found any effective means of coming

to intellectual terms with those uncertainties that such cognitive

developments sponsor, will likely attempt to finess such difficulties by

segregating matters of taste or opinion from the domain of demonstrable

fact and by assumimng that all such objective matters can be or are

already known with precision if only the proper expert can be located.

The differences that divide such defensively driven dogmatists and their

more realistic concrete operational counterparts, lies primarily in

their reason for dismissing the prospects of uncertainty. For the

persistent realist eventual access to absolute certainty is never

seriously doubted and the truth is automatically assumed to lie around

the next corner. The formal operational adolescent, by contrast, has had

all such optimistic expectations seriously shaken and turns to the

prospect of authoritatively given truth as a kind of salvation from

endemic uncertainty.

By contrast, those formal operational adolescents who respond to

uncertainty by retreating still deeper into untempered skeptical doubt

should generally refuse to commit themselves to any important life

decisions on the grounds that such choices will eventually prove to be unwarranted and ultimately arbitrary. If forced to make important choices, such skeptical adolescents would have little recourse except to resort to essentially non-rational decision making strategies based upon whim, or impulse, or chance. Finally, it is hypothesized that post-skeptical rationalists, who generally appreciate that certainties are never absolute and that reality is an interpretive achievement, should also understand that the options which face them in their own future need to be negotiated and renegotiated as good reasons for preferring one course over another present themselves. Some adolescents of this sort may feel that they do not as yet have sufficiently good grounds to warrant making serious commitments about their own future while others are already persuaded that the relevant evidence is already in. By either account, however, such post-skeptical adolescents should be open to the possible existence of a better argument and consequently prepared to think differently about their future on some later occasion.

The reader familiar with the available research literature on the process of identity formation will recognize the various options outlined above as being largely overlapping with the identity status alternatives initially proposed by Erikson (1968) and elaborated by Marcia (1966, 1976, 1980) and others (Archer, 1982; Grotevant, Thorbecke, and Meger, 1982; Munro and Adams, 1977; and Raphael and Xelowski, 1980). According to these authors, the status of an individual's efforts to form a mature sense of identity is jointly dependent upon the presence or absence of a sense of crisis regarding the need to make important life choices and whether or not commitments to particular choices or alternatives have yet been made. By this

account young people who have failed to seriously consider the matter of their own future and who consequently are not committed to any belief or action are said to be in a vague state of <u>identity diffusion</u>. In contrast, young people who are committed to particular goals or beliefs by virtue of having adopted, without crisis or evaluation, the values and goals of their parents or other significant authority figure are taken to have <u>foreclosed</u> upon their identity choices. Being locked in a state of needful indecision or crisis but having as yet failed to make or justify any specific commitments relegates one to the <u>moratorium</u> status. Having passed through this crisis and made commitments in one or more areas places one in the status of <u>identity achievement</u>.

A vigorous research literature has firmly established this identity status framework as a powerful explanatory tool in charting much of what is known to characterize the adolescent period. Studies have demonstrated the utility and validity of the identity statuses by relating them to diverse accomplishments in the areas of moral reasoning, self esteem, personality structure, and cognitive style and complexity (for reviews see Bourne 1978a, 1978b, and Marcia 1980).

It is not the purpose of this study to substitute the proposed model of epistemic development for the identity status scheme just outlined, or even to convergently validate the proposed typology of alternative epistemic stages against the identity status model. The divergent theoretic origins of the two approaches argues against these prospects. At the same time, however, it is assumed that our understanding of the problem of identity formation will be enriched by exploring the interface of these two explanatory systems and the series

of hypotheses and subsequent data analysis to follow is meant to advance this purpose.

At a general level, a series of global hypotheses may be advanced regarding what is anticipated by way of overlap and underlap between these two models. This ordered series of hypotheses involves predicting, on cognitive developmental grounds, as to which Marcian identity status or statuses young people at each level of epistemic development are likely to be found. Beyond these general expectations regarding the cross-classification of these descriptive typologies, there have been a number of areas where the categoric assignment of young people to one or another identity status has failed to parsimoniously account for the observed range of adolescent adjustment reaction or identity formation histories. It was anticipated that knowledge of a given subject's characteristic responses to matters of uncertainty and doubt would aid in the clarification of these ambiguous matters, and these expectations are framed later in this section as a series of second order hypotheses. Before turning to these more detailed matters, however, what is listed out first is a series of more general hypotheses outlining the anticipated areas of overlap between these two general descriptive frameworks.

As was suggested earlier in this section, the manner in which adolescent realists, dogmatists, skeptics, and rationalists approach uncertain issues in general ought to proscribe the manner in which they approach such concerns when they arise as components of any of the choices necessitated by the process of forming a coherent identity.

All concrete operational adolescents, because of their persistently realistic convictions that a simple, right answer is to be had to all

questions, should be insulated from the prospect that their own identity is in any serious doubt, and should be led to one or the other of two possible outcomes when they are queried about their own futures. If such persistently realistic individuals believe that they have already come into possession of the right answer to important questions about their own future then it is hypothesized that they will be scored as "foreclosed" on a standard measure of identity formation. If, by contrast, such individuals remain uncertain about their own future prospects but believe that all such ambiguous matters will sort themselves out in good time, they will most likely be characterized as "identity diffused." Which of these alternative identity status designations proves to be the most appropriate will depend upon matters unrelated to general epistemological issues and consequently both diffusion and foreclosure identity statuses are expected to be equally likely among individuals characterized as epistemic realists.

For subjects who recognize the subjective character of all knowledge and who respond to conflicting knowledge claims by taking refuge in dogmatic commitments to the pronouncements of external authorities, uncertainties in matters of identity ought to automatically engender similar sorts of solution strategies. Consequently, those young people who are scored as dogmatic within the proposed typology of competing epistemological types ought to be found exclusively within the foreclosed identity status. Unlike realistic foreclosures, however, who believe that the ultimate correctness of their choices is equally evident to all, dogmatic foreclosures may be expected to be less certain, believing that, while ordinary persons lack acceptable grounds for certainty, those whose values and goals they have foreclosed upon

somehow know better than they or have priviledged access to the sorts of certain solutions unavailable to the ordinary person.

On the opposite side of this relativistic coin are those adolescent skeptics who see no hope of rationally choosing among alternatives or of finding someone who can. Consequently, those adolescents who have entirely bought into this skeptical view and who believe that there are only arbitrary grounds for making choices are certainly caught in the needful state of indecision characteristic of the moratorium status. Despite the obviousness of this connection, it is also possible that such young skeptics may, when faced with their lack of rational grounds for making decisions, cease to attempt to make any. It is therefore hypothesized that those adolescents scored as skeptics may either be scored either as "identity diffused" or in the "moratorium" status.

Finally, epistemic rationalists, who have developed other than realistic or dogmatic epistemic grounds for settling ambiguous matters and for warranting their beliefs ought to be in a position to apply those insights to questions of identity and so are hypothesized to qualify as having an achieved identity status.

In dichotomous terms, this ordered series of hypotheses reduce to the prediction that epistemic realists and dogmatists will be found in the identity diffused and foreclosed statuses while the majority of the epistemic skeptics and rationalists will be found in the moratorium and achieved statuses. The only exception to this predictive bifurcation is that a subset of those adolescents who qualify as epistemic skeptics, because they despair of any rational grounds for making important life decisions, can be expected to be scored in the identity diffused category.

If, as is anticipated, support is found for the preceding hypotheses, more will have been accomplished than a simple demonstration of the fact that alternative testing procedures can lead to similar conclusions about adolescent identity status. Among the several anticipated advantages are the following. First, Marcia's procedures for assigning subjects to identity formation statuses are only tangentially related to what is otherwise known about the course of adolescent cognitive development. The studies of Berzonsky, Weiner, and Raphael (1975), Cauble (1976), Wagner (1976), Rowe and Marcia (1980), and Leadbeater and Dionne (1981), for example, all show only the most problematic relation to measures of formal operational reasoning.

Second, there is nothing about Marcia's typology that makes it at all self-evident as to why various identity problems arise when they do. By contrast, measures of epistemic doubt, rooted as they are in an explicit account of the place of such uncertainties in the usual cognitive course, offer better reasons as to why identity problems arise when they do.

Third, there are certain scoring confusions and empirical anomalies generated by the Marcia procedure which would be resolved by the alternative measurement approach. Among these are included the facts that Marcia's procedure offers no way of accounting for the observation: (1) that subjects scored as identity achieved often fall back into periods of crisis and uncertainty (Marcia 1976; Broughton, 1983); (2) that subjects can be pessimistic about the prospects for absolute certainty, yet be scored as foreclosed (Slugoski, 1984); and (3) that subjects are often scored as diffused for the contrasting reasons that they either have not seriously considered their own futures, or that

they have puzzled over such matters but see no way of resolving the several possible alternatives of which they are aware (Adams, Shea, and Fitch, 1979; Broughton, 1983; Donovan, 1975; Waterman and Waterman, 1971). The proposed strategy of scoring subjects in terms of the primary dimensions of certainty and doubt would provide means of resolving these conceptual, procedural, and empirical confusions.

General Summary of Hypotheses and Empirical Issues

As outlined in the preceding sections, this study introduces the achievement of generic doubt as a critical milestone in the course of adolescent development and attempts to substantiate its importance by showing its relevance to: (1) the achievement of formal operational competency, on the one hand; and (2) to the process of identity formation on the other. It was hypothesized in chapter 2 that the onset of formal operations would coincide with movement beyond a realistic epistemic level. A listing of the hypothesised relations between epistemic development and the identity formation process and the steps necessary in evaluating them outlined in this chapter include the following:

A strong relationship should exist between the manner in which given subjects respond to the general uncertainties prompted by conflicting knowledge claims and the way in which they deal with the ambiguities of their own uncertain futures. Consequently, subjects previously categorized as realists, dogmatists, skeptics, and rationalists should respond to procedures aimed at specifying their current "identity status" as follows:

a.   Subjects who are scored as epistemic realists and who assume, as a consequence, that what they should do or believe is now or will shortly become apparent, will be scored as either identity foreclosed or as identity diffused.

b.   All subjects who respond to epistemic uncertainties with dogmatic commitments should be scored as identity foreclosed.

c.   Subjects scored as epistemic skeptics, and who see no hope of rationally choosing among various alternative life courses, are forced to make such choices solely on arbitrary grounds, and should score either as identity diffused or in the moritorium status.

d. Subjects scored as post-skeptical rationalists, depending on whether they feel they have as yet uncovered good reasons for making such choices, should be coded as evidencing either a moratorium or an identity achieved status.

The procedures by which each of these hypotheses and empirical issues were put to empirical test are detailed in the method section which follows.

CHAPTER 5: METHOD

Subject Screening and Selection

In order to generate data relevant to the hypotheses outlined above a sample of subjects was required that could be clearly cross-classified as either concrete or formal operational, and as occupying one of Marcia's four identity statuses. Between middle childhood and adolescence the course of cognitive development, according to Piaget's theory, is ideally understood to pass directly and discretely from the period of concrete to formal operations. The assessment procedures meant to index this discrete transition are subject, however, to various forms of measurement error and, consequently, it is not always possible to unambiguously assign subjects to one or the other of these discrete stages. Because certain of the hypotheses to be tested in this study concern anticipated differences between concrete operational and formal operational individuals, it therefore was necessary to first screen a larger group of young persons in order to identify subjects who represent relatively pure instances of these two cognitive types. To this end an initial total of 110 high-school student volunteers who returned parental consent forms, were screened using the battery of cognitive developmental procedures described below in section 5.7. Of that initial sample, 70 students could be unambiguously classified as either concrete or formal operational on the basis of the criteria detailed in section 5.4 and were subsequently administered the remaining measures. The remaining 40 subjects were dropped from the study. Of the 70 students who satisfied the cognitive inclusion criteria, 9 were eventually dropped from the analyses. Three of these had incomplete data and six were not unambiguously assignable to a single identity status

using the modified version of Adams' (Adams, Shea, and Fitch, 1979)

classification criteria described below (see section 5.6).

Consequently, the findings to be reported in the results section

are based on the 61 subjects for whom complete data were available.

These 61 subjects varied by grade and sex as follows; 27 grade 8

students, 16 of whom were female; 15 grade 10 students, 7 of whom were

female; and 19 grade 11 and 12 students, 14 of whom were female. The

disproportionate number of females in the present sample reflects both a

differential rate of return of parental consent forms and a slight

overrepresentation of females in the classes in which volunteers were

solicited. The analyses to be reported upon below were initially run

separately for each sex and the male and female results were only pooled

if the gender difference analyses were non-significant.

Materials

The three measures of formal operational thought employed in the

screening phase of this study included a probability task (Arlin, 1978),

a combinatorial reasoning task (Sills and Herron, 1976), and an

isolation of variables task (Kuhn and Ho, 1977). A description of these

various tasks and the reasons for their selection will be outlined in

the following measures section.

The measure of identity status used was the extended form of the

Objective Measure of Ego-Identity Status (Adams, Shea, and Fitch, 1979).

The OM-EIS is comprised of questions written so as to reflect identity

concerns as they are expressed within each of Marcia's four identity

statuses and cover a range of content in both interpersonal and

ideological domains. This measure and the reasons for its adoption are also detailed in the measures sub-section below.

The measure of skeptical doubt employed in this study was the Nascent Skeptical Doubt Interview developed by Chandler, Boyes, Ball, and Hala (1985). This procedure involved presenting subjects with story problems in which two groups of people were described as espousing competing knowledge claims about a single issue. In each case a decision about the issue under debate was required. The presentation of each story was followed by a series of questions which focused upon how the subject constructed the problem and envisioned resolving the story issues. Responses to these questions were coded as reflecting either a realistic, dogmatic, skeptical, or rational epistemic stance.

Measures of Formal Operations

Whatever lack of conceptual clarity initially characterized

Piaget's original account of formal operational thought has been further

compounded by persistent confusions over how such abilities are best

measured. The original roster of measurement procedures proposed by

Piaget (Inhelder and Piaget, 1958) and subsequently employed by other

investigators is conceptually diverse (Keating, 1980), often

procedurally ambiguous (Broughton, 1984), and frequently fails to

demonstrate the empirical coherence that theory would lead one to expect

(Blasi and Hoeffal, 1974). Similarly, various investigators have

suggested that the achievement of formal operational competence is

context dependent and may only develop in those content areas in which

young people have had some specialized interest or training.

For all of these reasons there are no broadly agreed upon methods

of unambiguously assessing formal operational competency and the best

that one can hope for under these circumstanses is to triangulate upon

such abilities through a network of approximate measurement strategies.

Given the measurement error associated with any single procedure, the

choice of multiple measures also reduces the possibility of

categorization errors by permitting the use of more stringent

classification criteria. Beyond this, the use of such converging methods

is recommended by the structural nature of Piaget's theory of

operational competence, which sees the essential features of formal

operational thought reflected in a range of abilities not

quintessentially captured by any single task.

Given the decision to use multiple measures of formal operations,

other more pragmatic considerations entered into the choice of the three

procedures detailed below. Certain available formal operational measures involve the use of hardware and procedures not appropriate for the large scale screening effort required by the design of this study. In addition, certain of the measures reported in the literature have less well documented histories of use, or are frankly dangerous (e.g., the chemicals problem uses acids and bases), or sex biased (Labouvie-Vief, 1980), or otherwise inappropriate to sustain the interest of the older of the subjects to be tested in this study. All of these considerations together resulted in the decision to adopt the three measures of probabalistic and combinatorial reasoning and the ability to isolate variables described below.

Probability task. The probability task used in this study was adapted from procedures introduced by Arlin (1978) and involves two separate subtasks. The first is intended to tap the presence of the concrete operational ability to simultaneously distinguish parts and wholes. As in Piaget's classic whole/part problem (Flavell, 1963), subjects are presented in this procedure with a number of wooden beads of three colours and are asked to consider whether there are more beads of a particular colour (subordinate catagory) than there are beads altogether (superordinate catagory). Subjects who pass this task by maintaining the levels distinction between superordinate and subordinate catagories are categorized as possessing concrete operational competence.

The second part of this task is intended to tap the formal operational ability to utilize relative ratios in order to estimate the probability of drawing a bead of a particular colour in a blind

selection trial. This is accomplished by placing six beads of each of three colours in an opaque container and asking the subjects to first estimate the probability of selecting a bead of a specific colour on the first try. After they have selected a bead, subjects are next asked to estimate the probability of selecting another bead of the same colour. Correct probability estimates on both trials are required to pass this formal operational section of this task (see protocol in Appendix B).

Combinatorial reasoning task. The combinatorial reasoning task adopted is an electronic analogue to Piaget's classic chemicals problem (Inhelder and Piaget, 1958) originally developed by Sills and Herron (1976; see also Arlin, 1978). In this procedure subjects are presented with a box on which are mounted five switches and a light. They are asked to determine which combination (or combinations) of switches is required to make the light go on. All attempts are recorded and later scored as to whether the pattern of trials shows a systematic approach to the problem; that is, whether all possible combinations of one, two, three, four, and all five switches are attempted in some systematic order. The ability to logically generate a coherent series of combinations, when demonstrated, is taken to be indicative of formal operational competence (see Appendix B).

Isolation of variables. The isolation of variables task (Kuhn and Ho, 1977) taps the formal operational ability to generate and test specific hypotheses by systematically holding several variables constant. This is accomplished in an experimental context which involves presenting subjects with pictures of two sets of eight plants which

depict the results of a growth experiment involving three types of plant food. After hearing an explanation of the experiment, subjects are asked to answer, on the basis of the evidence presented to them, a series of questions regarding the main and/or interactive effects of the plant foods. In order to be scored as evidencing formal operational competence subjects must mount reasonably defensible arguments for which plant foods are and are not effective and whether this effectiveness varies with the type of plant involved (see Appendix B).

The hypotheses advanced in section 2.3 of chapter 2 refer to anticipated differences in the responses of concrete and formal operational young people (as defined above) to questions regarding matters of certainty and identity. In order to ensure a decisive test of these predictions it was necessary to be reasonably certain that the young persons included in the empirical portion of the study were either concrete or formal operational and not either pre-operational or in some transitional state between concrete and formal operational competencies. Accordingly, relatively stringent criteria were set for determining subjects' operational level (see Appendix B for additional details). Subjects who met these criteria for formal operational performance on at least two of these three tasks were classified as formal operational. Those subjects who were scored as falling short of this criterion and who also scored above the concrete operational criteria on more than one task were coded as being in transition between these two operative levels and were consequently dropped from further consideration. Subjects who failed to reach the formal operational criteria on any of the tasks and who scored at the concrete operational level on at least two of the tasks were scored as possessing concrete operational

competence. Given the age of the present sample (the youngest subjects were 13 years of age and in grade 8) it was <u>very</u> unlikely that any pre-operational subjects would be found. Still, simply knowing that a subject is not formal operational or in transition to formal operations does not formally guarantee that they are concrete operational. To guard against this remote possibility such subjects who, in the experimenter's estimation, had not performed well on any of the formal operational measures were also evaluated with part 1 of the Arlin probability procedure in order to demonstrate that no pre-operational individuals were included. This was only done with 10 of the subjects in the initial sample, all of whom passed this part of the Arlin procedure.

The scoring of each of these tests of formal operations required some degree of judgement and necessitated a test of the reliability of these coding operations. To this end, the responses of 20 randomly selected subjects were scored independently by two raters experienced with the coding system. Inter-rater agreement was 90% for both the isolation of variables and the combinatorial reasoning tasks and 100% for the probability task.

Measures of Epistemic Certainty

The preceding problem of arriving at satisfactory ways of indexing formal operational competence centered upon the making of informed choices from among an array of competing measurement procedures already available in the research literature. Quite the reverse is true with respect to potential measures of uncertainty and doubt. The last decade of entries in the Psychological Abstracts, for example, does not even index these terms. This apparent shortfall is partially semantic, however, and there have been numerous other investigators (e.g., Broughton, 1978, 1981; Chandler, 1975; Elkind, 1967; Kitchener and King, 1981; Kuhn, Pennington, and Leadbeater, 1983; and Perry, 1970) who have shared the present concern over the likely consequences of arriving at a point in intellectual development at which old confidences are lost and systematic concern over the possibility of certain knowledge begins to appear. Nevertheless, for reasons already alluded to, the bulk of these potentially relevant studies have focussed attention upon those sorts of skeptical concerns that typically do not appear before the period of young adulthood.

College students, as Perry (1970), Kitchener and King (1981), and others (Clinchy, Lief, and Young, 1977; Kurfiss, 1977; Schmidt and Davison, 1978; and Stephenson and Hunt, 1977) have shown, do come to have serious doubts about the range of competing knowledge claims to which they are exposed in the course of pursuing their higher education. Because of the arcane or technical nature of the stimulus problems employed in these earlier studies, however, this fact has only minimal relevance for the current question of when, in the course of their ontogenetic development, adolescents _first_ come to entertain serious

questions about the authenticity of the various competing beliefs to which they are exposed. While Broughton's (1978) work and that of Mansfield and Clinchy (1985) lend credence to the notion that serious epistemic doubts regarding the possibility of absolute knowledge do in fact put in a first appearance sometime in early adolescence, the majority of investigators working in this field have tended to focus attention upon college samples and generally have made use of quasi-philosophical and open-ended interviews that make heavy demands upon the ability of young persons to freely speculate about such uncertainties. Consequently, such assessment procedures may have seriously underestimated the ability of much younger formal operational subjects to take issue with absolutistic claims for certain knowledge. The upshot of all of this is that there are no pre-existing procedures which can be brought into play to determine when, in the course of their development, young persons first entertain serious doubts regarding the ultimate knowability of certain so-called matters of fact.

The conceptual analysis of this problem, outlined in chapter 2, provided a series of theoretical arguments for anticipating that nascent skeptical doubts are a natural expression of formal operational thought and should put in their first appearance at the same point in cognitive development. As already suggested, this co-occurrence is not understood to be the consequence of any cause and effect sequence, nor is it thought to come about because formal operations is in any sense a necessary or even sufficient condition for the emergence of skeptical doubt. Rather, as was argued in the introduction, both formal operational competencies and emergent skeptical doubts are jointly understood to be alternative expressions of the same underlying

structural changes -- changes which, on the one hand, make accessible a more mature conception of physical science matters, and, on the other, are responsible for those epistemic developments that spell the end of earlier realistic notions of knowledge acquisition.

If, as is proposed here, formal operational competency and nascent skeptical doubts are both expressions of an underlying set of structural changes common to the course of adolescent development, then the emergence of formal operations could be seen to constitute sufficient evidence for the co-occurrence of skeptical doubts. This, in fact, would be the case if the structural equivalence claimed for formal operations and such collateral doubts was currently more than a mere theoretical assertion. As is detailed in the hypothesis section of chapter 2, however, the establishment of this equivalence relation was the empirical objective of the first stage of this research enterprise. In advance of this demonstration, however, and for reasons necessary to the second phase of this research program, what is presently required is some independent index of the extent to which adolescents are or are not characterized by such generic doubt. As outlined above, procedures for accomplishing this measurement task do not currently exist and need to be newly minted for this present purpose.

The measurement strategies introduced in the earlier research of Perry (1970), Kitchener and King (e.g., Kitchener and King, 1981; and King, Kitchener, Davison, Parker, and Wood, 1983), and Kuhn, Pennington, and Leadbeater (1983), while seen to be unsatisfactory for present purpose because of their reliance upon matters remote from the lives of most adolescents, do, nonetheless, employ an assessment format that lent itself for adaptation to the purposes of this study. In a way which

parallels the classical work of Kohlberg (Kohlberg, Levine, and Hewer, 1983) and the more recent efforts of Walker, de Vries, and Trevethan (in press), Gilligan (1982) and others (Langdale, 1983; and Lyons, 1983), all of which concerns subjects' attempts to resolve matters of competing human interest, the procedure introduced by Kitchener and King (1981) is meant to capture the attempts of their subjects to resolve matter of competing knowledge claims.

In general terms these authors presented their subjects with various story problems in which experts were said to disagree, and used the commentaries which subjects made about these problems as a source of evidence concerning their willingness to cast doubt upon the necessary superiority of one of these competing views over the other. Given the present purposes, the short-fall of these earlier procedures is that before the period of late adolescence few young people have the informational background necessary to enter into such debates.

In sharp contrast, the work of Turiel and his colleagues (Nucci, 1981; Smetana, 1985; Turiel, 1983; and Turiel and Smetana, 1984), strongly suggests that, when questioned about more familiar matters, adolescents are often quick to characterize competing knowledge claims as debatable matters of simple social convention. While this earlier work does not self-consciously undertake to address the question of when young persons first become capable of entertaining serious skeptical doubts, it does raise important questions regarding the conclusion, based entirely upon populations of university students, that the onset of such skeptical considerations first occurs during the period of young adulthood.

The procedure adopted in the present study was intended as a hybrid version of the methods of Kitchener and King (see also Kuhn, Pennington, and Leadbeater, 1983) on the one hand and Turiel on the other, and undertakes to present instances of conflicting knowledge claims regarding more commonplace matters of social convention. The result of this procedural borrowing is a set of epistemological dilemmas which, like the procedure introduced by Kitchener and King, present instances of contrasting knowledge claims, and, like the studies of Turiel and his colleagues, set such problems in more familiar contexts. The purpose behind the creation of such dilemmas is to offer subjects a competition between knowledge claims and to do so in ways which allow them to bring to bear personal knowledge about what do and do not count as reasonable alternatives in more familiar matters of personal judgement.

While the specific details of such epistemological dilemmas were free to vary, several constraints limit the kinds of knowledge claims which are relevant for testing the abilities of young adolescents to entertain possibilities of serious doubt. First, it seemed necessary to choose instances of contrasting beliefs which deal with sufficiently familiar concerns so that even the youngest subjects would regard them as relevant matters. Second, it seemed obligatory that the particular beliefs that were set in opposition to one another be sufficiently credible as to represent what William James (1956) referred to as live rather than dead alternatives. Finally, it was reasoned that the matter under debate should concern issues sufficiently marked by the dictates of social convention that expert opinion could not be seen to automatically lay such matters to rest, and that reasonable persons could find room in them for serious debate. Without these minimal

constraints it was feared that adolescents, otherwise capable of serious skeptical doubt, would fail to evidence such doubts by disqualifying themselves, losing interest, or too quickly demurring in the face of remote, expert opinion.

The Epistemic Doubt Interview

The Epistemic Doubt interview was constructed in order to provide subjects with a series of controlled opportunities to make explicit the nature of their epistemic assumptions regarding the nature and attainability of knowledge and truth. Based on the expectation that subjects' assumptions regarding the nature of knowledge would be thrown into boldest relief when they were considering instances of contradictory or competing knowledge claims, the two story problems featured in the interview were written so as to portray different groups of individuals as advancing divergent knowledge claims about the same issue or event. In one story a student group and a parent group are described as arguing opposite sides of the question of whether a driver training program should be offered in their high school. In the other story, authors of two books on the position of Native Indians within mainstream North American society are portrayed as disagreeing over the optimal course for future native/non-native relations. The issue of native/non-native relations is a topical one and was made more salient by the fact that both schools in which data collection ocurred had recently introduced activities and curricula intended to increase students awareness of native culture and concerns (see Appendix C for the complete text of each story).

A series of standard probes followed each story which were intended as a means of making as explicit as possible how it is that the subject both _constructed_ and undertook to _resolve_ the competing knowledge claims set out in each story problem. In each case the probes were intended to encourage subjects to press the limits of their understanding of the problem posed and to elaborate their beliefs regarding the merits of possible resolution strategies. In the problem construction section of the interview, subjects were first asked to what extent the disagreement portrayed in the story was due to a lack of appropriate access to the facts on the part of one or the other group of protagonists. To the extent that the response to this probe laid full responsibility for such disagreements upon matters of differential informational access, the remainder of the probes in this section simply served to confirm the extent to which the subject's belief that differential access to the facts was the single cause of disagreement. If, instead, responsibility for the contrasting claims made by the story characters was not laid entirely at the door of access to different facts, and to the extent that the subject was not spontaneously forthcoming with what else might be involved, all subsequent probes were intended to encourage them to expand upon possible reasons for continued disagreement. These probes amounted to requests for the subject to be more explicit about the nature of those other factors which he or she believed might also be responsible for such disagreements and the manner in which the facts relate to the knowing process.

Once subjects had made clear what they took to be the basis for the competing knowledge claims, the second section of the interview accepted that construction of the problem and went on to ask subjects what they

saw as a viable means of dealing with the problem as defined. In order to facilitate this, the first probe in this section asked whether some third party specialist or expert could be of any potential assistance in resolving the problem. The optional follow-up probes to this general question were intended to allow subjects to elaborate upon the role which experts or other third parties might play. Whenever such experts were understood to be of limited use, the remaining probes enquired whether there were some other means by which one might decide which of two competing claims might have the greater merit and should be used as a guide for subsequent action.

A final set of general probes, which followed the second story, was intended to provide additional opportunities for subjects to both reframe the problems presented and to describe what they believed to be generally viable solution strategies in situations of this sort. By pressing for generalities common to both stories this last set of probes was intended to encourage general statements regarding the relevance of competing knowledge claims for the whole epistemic enterprise.

Scoring the Epistemic Interview

Based upon the earlier efforts of King and Kitchener (1981), Kuhn, Pennington, and Leadbeater (1983) and the results of pilot work using earlier forms of the Epistemic Doubt Interview described above (see also Appendix C), operational definitions of the four epistemic stages outlined in chapter 3 were developed and used to score subjects' responses to the Epistemic Doubt Interview. These working definitions for realistic, dogmatic, skeptical, and rational interpretations of these story problems are listed below.

Level 0: Realism. At this level the world is taken to be constituted independently of anyone's attempts to perceive or know it. As a result of this assumption, conflict regarding the meaning of events can be resolved by simply taking a closer look at the particular facts of the matter. All doubts about the form or nature of such knowledge are case-specific and are understood to have no generalizable bearing upon other epistemic issues. Scored at this level are all constructions of the story problems which assign exclusive responsibility for all disagreements to differential access to the facts. For example, parents who favor the removal of driver training from the high-school curriculum could be viewed from this perspective as having acquired different information than that used by the student committee. Because of this, conflicts are understood by level 0 realists to be resolvable through a more complete reading of the facts.

Level 1: Dogmatism. The contents of the thoughts of subjects scored at this level are of two sorts -- first order representations of an external reality and second order reflections about such first order representations. This amounts to the drawing of a category distinction between facts and opinions. In this view, all facts continue to be seen as the automatic byproduct of direct exposure to the facts. Opinions, by contrast, are understood to simply reflect idiosyncratic comments upon that reality and in this sense are not directly implicated in the knowing process. At the same time, however, such opinions are believed to have the potential to predispose people to be strategic in their selection or reporting of the facts. Alternative constructions of a given problem are consequently understood by subjects at this level to reflect the fact that the parties to such disagreements not only have

access to different facts but that they have either selected or recounted these facts in opinionated and interest driven ways.

Up to this point there is little in this description of dogmatic responses that would enable them to be easily distingiuished from earlier realistic responses. Indeed, young persons of all ages make some use of the terms "fact" and "opinion". Instead, the distinction hinges on the novel relation that is presumed to hold between the domains of fact and opinion. For the Realist facts always precede and may be easily distinguished from opinions which are treated as the equivalent of guesses. Opinions, in short, enter the epistemic picture for realists only after the facts have done their work. For the Dogmatist, however, this relation is reversed with opinions slipping in ahead of and obscuring direct access to the facts. For the Realist, conflict resolution requires nothing more than access to additional facts. By contrast, for the Dogmatist, resolution of what are recognized to be motivated differences of opinion must be sought through appeals to some disinterested third party whose knowledge of the facts is not clouded by subjective bias. By relying upon such expert knowledge, objectivity can be restored even if first hand access to the truth is lost.

Level 2: Skepticism. At this level the absolute distinction between facts and opinions characteristic of individuals classified in the previous scoring catagory collapses and opinions are no longer understood to constitute a category of mental contents different from factual knowledge. Instead, all knowledge comes to be understood to be filtered through a set of lenses or veils which give a subjective character to all experience. In light of this constructivistic stance, all conflicts are taken to be the inexorable result of the different

sense people make of their experiences. All responses which indicate
that people with ostensibly similar experiences could come away with
different subjective understandings are scored at this level (see
Appendix C for examples).

The upshot of this relativistic understanding of the nature of
disagreement is that no absolute footing or perspective may be found
from which to evaluate conflicting knowledge claims. This is reflected
in the belief that the positions of the parties to conflicts of the sort
found in the Epistemic Doubt Interview procedure are irreconcilable.
The only resolution strategies which are suggested or endorsed at this
skeptical level are based on such non-rational strategies for making
decisions as chance (tossing a coin), conformity (do what everyone else
seems to be doing), or whim (doing whatever you feel) (see Appendix C
for examples).

Level 3: Rationalism. The defining difference between a skeptical
and rational epistemic posture is the rationalist's belief that it is
possible to make informed choices and defend one's beliefs despite the
absence of any absolute criteria for deciding which of a range of
alternative options is ultimately correct. Unlike the skeptic who
despairs of ever again having adequate grounds for believing anything
with certainty, the rationalist invokes alternative criteria of
reasonableness, internal consistency, or scope of coverage as
appropriate grounds for choosing among competing alternatives. Any
suggestion that it is possible to resolve the conflict presented in the
stories without concern over who is absolutely right or wrong is scored
at this level (see Appendix C for sample responses from all epistemic
stage levels).

Assigning Epistemic Interview Scores

Each subject's responses to these stories generated six scoring opportunities or units. This total includes distinct sets of problem construction and problem resolution statements for both of the stories and for the set of more general probes which closed out the interview. The following scoring sequence was followed in arriving at a single epistemic stage designation for each subject on each story problem. First, whenever the epistemic levels assigned to the problem construction and resolution phases of the individual stories were identical, this same scoring catagory was simply assigned as a summary score for that story. This was the case in the majority (136 out of 163) of the scorable units (story responses). Of the remaining 27 construction/resolution pairs, most (18) were instances in which the problem construction portion of the response was scored at level 2 while the attendant resolution strategy was scored at level 3. As was indicated earlier, level 3 rational strategies are intended to resolve, or provide ways of proceeding in the face of the problem of relativism as it is understood at level 2. A level 2 understanding of the challenge posed by the presence of competing knowledge claims thus frames the problem to which a level 3 rational strategy might provide the solution. All such problem/resolution units were scored as indicative of level 3 epistemic assumptions. In all but 2 of the remaining 9 problem construction/resolution units the resolution proposed was scored one stage higher than the initial problem construction (i.e., level 2 vs. level 1 or level 1 vs. level 0). In addition, in each such case the description of the proposed resolution strategy included an explicit re-statement of the problem at a level consistent with that assigned to the

proposed resolution strategy itself. In light of this, and as a general
scoring rule, all such instances were assigned to the higher of the two
epistemic stages. Once this within-story coding procedure was completed,
the resulting scores were combined to produce a general epistemic stage
score for each subject.

Assignment of a single epistemic stage score across all three
scoring opportunities was accomplished as follows: For 46 of the 61
subjects all of their story responses were scored at the same epistemic
level which was thus assigned as their general epistemic stage score.
The remaining 15 subjects responses spanned two epistemic levels.
Following Piaget's convention of reporting such differences as major and
minor stage scores (1960; for a specific example of the application of
these criteria in the area of moral reasoning see Kohlberg 1976 or
Walker, 1980), the stage score assigned to two of their three
construction/resolution units was assigned as their major epistemic
stage while the remaining stage assignment was recorded as a minor
stage.

This process leads to a total of 10 possible scoring designations
ranging from pure level 0 naive realism to pure level 3 rationalism
(i.e., 0, 0(1), 1(0), 1, 1(2), 2(1), 2, 2(3), 3(2), 3). For the purposes
of certain of the data analytic strategies to be reported (e.g.,
specifically, for the correlations), this sequence was treated as a
continuous variable. For other purposes in which more categorical
comparisons were required (e.g., between cognitive developmental level
and identity status) all major/minor stage scores were rounded up to the
next pure stage. This procedure is warranted on the grounds that any
clear indication of a higher level appreciation of epistemic conflict

can be understood as evidence of competence at that level even if it is not yet invariably evident in performance. Use of this scoring convention is further warranted by the fact that responses obtained through the sort of interview procedure utilized in this study are not as subject to the kind of false positive errors often found on paper-and-pencil item endorsement forms of enquiry. If a person can give scorable evidence of a higher level understanding in an interview context it is important that they receive credit for that understanding. Consequently, it was in the spirit of focusing initial attention on young people's best epistemic competence rather than the particulars of their performances that subjects' stage scores were rounded up in the present study.

Scoring Reliability

Following the scoring conventions outlined above, each subject's scored responses to individual stories were summarized to produce an overall stage score. This process is objective and as such there need be no concern regarding the reliablity with which that arithmetic process was carried out. However, two important reliability issues relating to the assignment of single interview scoring units to epistemic stages must be addressed. First, there is the general question of the extent to which the conceptual distinctions between stages within the model have been clearly operationalized in the scoring instructions. This is reflected in the degree of agreement among different judges attempts to score subjects' interview responses. Related to this, and of special concern in light of the expectation that subjects' epistemic position would be consistent across the stories, is the issue of whether, in

scoring individual subjects' protocols, the principal judge was biased towards attributing an artificially high level of consistency in epistemic stage across all of each subjects' responses by being aware of their scores on earlier stories.

To address both of these reliability concerns, a random sample of 60 scoring units, including approximately equal numbers of problem construction and resolution statements from each of the three sections of the interview, was drawn from the sample of all scoring units that had been scored by the author. These scoring units were typed on separate cards with no identifying numbers or scoring designations. The cards were then shuffled and blindly scored by four other judges familiar with the scoring criteria. Percentage agreement between these judges and the author's scoring was 79%, 85.2%, 88.9% and 90%. In addition, in all but 3 of the cases where there were mismatches among the judges, the difference was not more than one stage. That these levels of agreement were obtained with raters blind not only to the identity of the subject but also to the remaining five sixths of each subject's protocol indicates that responses to the interview may be reliably assigned to specific epistemic stages using the scoring system, described above and further detailed in Appendix C, and that this may be accomplished when whole protocols are scored without there being a detectable biasing of stage scoring in favour of greater within-subject consistency.

Measures of Identity

While there is some continuing debate as to what constitutes a definitive measure of formal operations, there is an almost total consensus concerning measures of identity. Since its introduction, Marcia's (1966) Identity Status Interview (ISI) has been widely accepted as a useful and reliable measure of identity formation in late adolescence (Bourne, 1978a, 1978b). Marcia's familiar operationalization of Erikson's psychosocial account of identity formation specifies four identity statuses (diffused, foreclosed, moratorium, and achieved) each of which are seen to depend jointly upon the presence or absence of a sense of crisis regarding the need to make identity defining choices and upon the felt need to commit oneself to some particular set of goals, values, or beliefs. The Identity Status Interview consists of a series of questions aimed at eliciting statements regarding the subject's experience of crisis and the presence of commitment in the areas of occupational choice, religious beliefs, political philosophy, sex roles, and sexual intercourse. This procedure was originally intended for use with late adolescents and young adults in a college setting.

Other investigators have undertaken to develop objective measures of ego-identity status and to adapt them for use with early and middle adolescent populations. Such objective procedures are quicker and easier to administer and may be given to groups of subjects. By contrast, one-on-one contact and considerable training are required to usefully conduct and score the Marcian Interview. While objective measures of identity have been used in a range of studies (for reviews see Bourne, 1978a, 1978b; Bosma, 1985; and Craig-Bray and Adams, 1985),

the criterion against which their validity as a measure of ego-identity status must be evaluated is the Marcia Identity Interview. The available objective measures have achieved varying degrees of concurrent validity with this interview procedure. The one that fairs as well or better than most is Gerald Adams' Objective Measure of Ego-Identity Status (OM-EIS).

The OM-EIS consists of 64 items covering 4 content areas within each of 2 general identity domains. The ideological domain is comprised of religious, political, occupational, and philosophical lifestyle content areas. The interpersonal domain is comprised of friendship, dating, sex roles, and recreational activity content areas. Focussing upon the presence or absence of crisis and commitment, two items within each content area were written so as to reflect the combination of crisis and commitment held to define each of the identity statuses. Subjects are asked to rate, on a 6 point scale, the degree to which each item reflects their own thinking in each of the content areas. These ratings are then summed across content areas within statuses and domains to produce scores for each subject on each identity status within each domain. These scores may be treated separately or summed to produce an overall score for each subject on each identity status scale. When desired, these scale scores may be converted to a categorical identity status assignment using the following criteria.

1. Individuals with scores falling one standard deviation above the mean on a given scale were scored as being in that status if all remaining scores fell below that cutoff.

2. Individuals with scores falling less than 1 standard deviation above the mean on all four measures were scored as moratorium (such a low profile was assumed to reflect a unique form of identity crisis).

3. Individuals with more than 1 score above the standard deviation cutting score were scored as persons in transition and given a "transitional stage" typology, e.g., diffusion-moratorium, diffusion-foreclosure, etc. (Adams, Shea, and Fitch, 1979).

Using these criteria, the convergence between the OM-EIS and the Marcia Interview has ranged from 70 to 100% for the four identity statuses (Adams, Shea, and Fitch, 1979, Adams, Ryan, Hoffman, Dobson, and Neilson 1984). These levels of convergence are at least as high as the level of inter-rater agreement commonly reported for scoring of the Marcia Interview (Marcia, 1980). In light of this, the OM-EIS was adapted for use in the present study. Minor changes were made in several OM-EIS items to render them more appropriate for use with high school students. Any item which referred to career or vocational goals was amended to include reference to educational goals as well. In addition, several items relating to sex roles were expanded slightly, due to the age of the present sample, to include consideration of future marriage and spousal roles.

The criteria by which subjects' scale scores were converted to categorical status designations were also slightly modified. The convention, proposed by Adams, of assigning those subjects whose scores fell below the standard deviation cut-off point on all status scales to

the moratorium status is seen here as more of a methodological convenience to allow the retention of subjects than a theoretically defensible decision rule. It is more appropriate, especially given the younger age of the present sample and the suggestion that these two types of moratorium may differ in other ways (Abraham, 1983), to maintain that such subjects distinguish themselves by purposefully avoiding endorsement of any item which indicates serious concern with identity issues. As such, all subjects whose scale scores fell below the standard deviation cut-off point on all scales were assigned in this study to the identity diffused status.

An additional advantage of the OM-EIS is that it makes it possible to consider subjects' relative identity status preference by comparing their scores on each of the identity status subscales. This sort of analysis, originally suggested by Marcia (1966) and advanced by Lieper (1981), acknowledges that subjects' place in the identity formation process may not be optimally defined by a single status and may be better described by an identity status profile.

Finally, past research has indicated that people's consideration of identity issues may vary depending upon content domain with males being more likely to evidence "higher status" considerations within the ideological domain and females more likely to do so in the interpersonal domain (Marcia, 1980). To account for this, the adapted classification criteria were applied to subjects' scale scores in each of the content domains. Of the 61 students comprising the final sample and for whom complete data was available, 30 were categorized within the same identity status on both the ideological and interpersonal subscales. The remaining 31 subjects were classified into a single status on one

subscale and fell below the cutting scores on the other scales. All subjects of this second sort were assigned to the status for which they met the entrance criteria regardless of content domain.

Before moving on to a consideration of the results of this study it is necessary to briefly consider how the psychometric qualities of the OM-EIS, as demonstrated within the present sample, compare to its performance in other samples. The levels of reliability and discriminant validity found for the OM-EIS in the present sample are comparable to those reported by Bennion and Adams (1986). Levels of internal consistency, as indicated by Cronbach's Alpha coefficient range from adequate to good (see Table 1) with the exception of the Ideological Diffusion scale and the Interpersonal Moratorium scale (Alpha= 0.44 and 0.39 respectively).

Discriminant and convergent validity levels are indicated by the intercorrelations among the identity scale across both content domains as presented in Table 2. For all but the Ideological Diffusion scale, each scale within the Ideological content domain correlates strongly and positively with its counterpart scale in the Interpersonal content domain and negatively or insignificantly with most of the other scales in both domains.

This correlational structure was examined further by submitting it to a principal components factor analysis run on the eight identity sub-scales. Varimax rotation of the resulting three factor solution (see Table 3) yielded a clear identity achieved factor as well as factors which were labeled foreclosure and moratorium. The failure of the diffusion scales to define their own factor (even in a forced four factor solution), and to load instead on the moratorium and foreclosure

TABLE 1

OM-EIS Scale Reliabilities (Cronbach's Alpha)

	Ideological	Interpersonal
Diffused	.44	.65
Foreclosed	.58	.76
Moratorium	.72	.39
Achieved	.68	.65

N = 67

TABLE 2

OM - EIS Subscale Intercorrelations

| | Ideological | | | Interpersonal | | | |
	Forecl.	Mor.	Ach.	Diff.	Forecl.	Mor.	Ach.
Ideological							
Diffused	.26*	.28*	-.22*	.23*	.28**	.27*	.21*
Foreclosed		-.19	-.06	.34*	.52***	-.19	-.07
Moratorium			-.18	-.09	-.19	.48***	.06
Achieved				-.08	-.07	.13	.41***
Interpersonal							
Diffused					.24*	-.03	-.17
Foreclosed						-.19	.18
Moratorium							.16

N = 67

* p < .05
** p < .01
*** p < .001

TABLE 3

Ego-Identity Scales Factor Structure Using Varimax Rotation

	Factors*		
	I	II	III
Ideological			
Diffused	.60		
Foreclosed	.81		
Moratorium		.81	
Achieved			.83
Interpersonal			
Diffused	.56	.65	
Foreclosed	.78		
Moratorium		.76	
Achieved			.82
% of Variance Accounted for	25.6%	21.9%	18.6%

Total Variance Accounted for = 66.1%

* Inclusion criteria: All factor loadings above .25 are included in this table.

factors may reflect a general lack of concern with matters of identity on the part of certain subjects in the present high-school sample who either believe they have had their answers all along (foreclosure), or who are working towards them at an unhurried pace (moratorium). It is also suggested by these data that there may be more than one type of diffusion within the diffusion status, a possibility which will be returned to in more detail below in the results section.

To summarize, briefly, subjects in this study were initially screened using three measures of formal operational competence: the probability and combinatorial reasoning tasks and the isolation of variables task. On the basis of their responses to these measures, subjects who were clearly classifiable as either concrete or formal operational were given the remaining measures. Subjects who could not be unambiguously classified were dropped from further consideration. Subjects continuing in the study completed the OM-EIS and were assigned to an identity status on the basis of their responses according to Adams' earlier detailed criteria. These same subjects were also administered the Epistemic Doubt Interview and, on this basis, were assigned to an epistemic level.

Procedure

Each student volunteer was seen individually in a room provided by the school for both the screening and testing sessions. Students participating in the cognitive screening procedure were first administered a task of probability reasoning. This task was procedurally less complex than the other formal operational tasks to be administered and thus aided in establishing a rapport with the student. Following this the combinatorial reasoning and isolation of variables tasks were administered in randomized order. If the subject clearly had difficulty with all of the formal operational tasks they were administered the concrete operational subtest of the probability procedure. Total testing time in the screening session was approximately 20 minutes. Student's responses on these tasks were recorded on answer sheets by the experimenter for later scoring. Inter-rater reliability was checked on a randomly chosen subset of the data using two or more additional raters. The procedures by which this was accomplished were detailed in the measures sections above (sections 5.4 to 5.6).

For those students selected to continue on the basis of the screening procedures, the second testing session took place on a subsequent day and lasted for 40 to 60 minutes. In this session students were administered the OM-EIS and the nascent skeptical doubt interview in random order. All responses were recorded on audio tape and later transcribed for scoring and analysis.

CHAPTER 6: RESULTS

This section details the results of the several empirical steps undertaken in an effort to evaluate the proposed model of epistemic development and its anticipated relations to other developmental variables including age, cognitive developmental maturity, and identity status. Section 6.2 describes the outcome of a series of attempts to determine the extent to which these findings conform to usual criteria for a strict stage model. Section 6.3 describes the results relating to the nature of the relationship between formal operations and skeptical doubt. Following this the distribution of identity statuses within the present sample will be reported in section 6.4 and the relation between cognitive development and identity formation will be reported in section 6.5. Finally, section 6.6 details the results of efforts to further relate these data to an associated set of findings regarding the identity status of these same subjects.

Structural Adequacy of the Epistemic Stage Model

The summarry epistemic stage scores for each subject provide the best means of testing the adequacy of the stage model advanced in this study. Table 4 arrays these summary scores by grade level. Both males and females were approximately equally distributed across the epistemic levels (Mann-Whitney U-Test, z= -.36, p > 0.7).

Two important results may be observed in this table. First, it is clear that with increasing age, as indicated by grade level in Table 4, there is a corresponding increase in overall epistemic stage score. This is reflected in a correlation of 0.30 (p < 0.01 Note: All correlation coefficients are Pearson product moment coefficients) between age and epistemic stage score (see Table 5). The present cross-sectional

TABLE 4

Epistemic Level by Grade

Epistemic Level

Grade	Realistic	Dogmatic	Skeptical	Rational
8	7 (26%)*	11 (41%)	8 (30%)	1 (3%)
10	2 (14%)	5 (33%)	5 (33%)	3 (20%)
11, 12	0 (0%)	4 (21%)	11 (58%)	4 (21%)

N = 61

* Row percentages are indicated in brackets

TABLE 5

Correlation Matrix
Age, Developmental and Epistemic Level

	Cognitive Developmental Level	Epistemic Level
Age	.45**	.30*
Cognitive Developmental Level		.54**

* = 0.01
** = 0.001

results do conform, then, with the minimal requirement that any proposed developmental sequence must show some relation to chronological age. At the same time it is also apparent that, as with many developmental constructs, there is also considerable within-age variability in epistemic level (i.e., most levels are represented at all grades).

Structural theories of cognitive development, such as that which has guided the present research effort, hold out only modest expectations regarding first-order relationships between age and constructs of interest, and instead judge the adequacy of any proposed developmental variable against the more demanding criteria that they covary with other cognitive variables and conform to other criteria for strict stage models including the familiar structure, sequence, and hierarchy criteria described above in section 3.1 of chapter 3. It is thus necessary to evaluate the performance of the proposed epistemic stage model against these criteria before proceeding with comparisons between it and other developmental constructs. Consequently, each of these criteria of structural adequacy will be addressed in turn.

The structure criterion. The structure criterion demands that people be internally consistent in their epistemic level assignments across varying contexts and contents, and further that their responses to the epistemic interview probes be homogeneously grouped about a single epistemic level.

In order to test these expectations, the 366 scoring units collected in the study were considered (i.e., a problem construction score and a resolution score on each of two stories and the summarial questions for each of the 61 subjects). Of this potential total, 26 scores were missing as a consequence of the fact that a subset of the

sample did not receive part three of the interview procedure due to time and scheduling constraints. Of the remaining 340 scoring units, 27 were not clearly classifiable due to lack of sufficient elaboration on the subjects' part. Of the remaining 313 scorable responses, 75% were scored at subjects' modal epistemic stage and 17% were scored at an adjacent stage either above or below the modal stage but not both. There was only one subject who had responses scored at three epistemic stages, though these too were adjacent. This level of consistency, with 92% of all scorable responses being coded at the modal or a single adjacent stage, compares very favourably with results in the domain of moral reasoning reported by Colby et al. (1983) in relation to Kohlberg's 5 stage model of moral reasoning development. Colby et al. found 68-72% of moral reasoning scored at modal stage and 97-99% scored at the two most frequent and always adjacent stages. On these grounds, the results from the present sample are taken as providing strong support for the model having fulfilled the criterion of internal consistency.

The division of the epistemic interview into three sections (i.e., two stories and a set of summarry questions) also permitted a check on the consistency of subjects' epistemic stage scores across differing story contents. Given the method outlined earlier (see chapter 5, section 5.5) by which a general stage score was arrived at for each subject in each interview segment, the question of cross-context consistency may be addressed by comparing the number of subjects whose general epistemic stage score represents a single pure stage score with those whose general scores reflect a combination of two stages. In the present sample, 46 (75%) of the subjects were assigned the same stage score in all three interview sections. All of the remaining subjects

were scored at the same stage in two out of three interview sections with the third section being scored at an adjacent stage. This result, along with the previously reported finding of within subject consistency at the level of problem construction and resolution, is seen to argue strongly for the appropriateness of stage-typing individuals' epistemic assumptions.

The sequence criterion. Adherence to the sequence criterion (i.e., that the subjects will pass through the proposed stages in a fixed sequence), in order to be properly assessed, requires both long term longitudinal testing, to check for regression, and short term experimental interventions, to check for the possibility of stage skipping. While such strong tests of the sequence criterion are not possible in the present cross-sectional study, two available findings are consistent with what is required to satisfy this sequence criterion.

First, the results reported in section 5.5 are consistent with the sort of developmental movement which would be required to satisfy the sequence criterion in that all subjects' responses were found to be in either one stage, or at most, in two adjacent stages. If movement through the stages was truly non-systematic, then a greater diversity of stage scores would be expected than was observed in the present study.

Second, the positive correlation between age and epistemic stage (r = 0.30, p < 0.01) is indicative of movement from lower to higher epistemic stages with development. Thus while the definitive test of the adherence of the present epistemic stage model to the sequence criterion awaits a longitudinal research design, the cross-sectional results currently under consideration argue for the prospect that the model may be shown to satisfy the sequence criterion.

The hierarchy criterion. Finally, in view of the fact that the epistemic stages described in this study have the character of integrated structures and that a provisional case has been made for their defining an ordered developmental sequence, it is possible to address the extent to which each of these stages represent a hierarchical integration of previous stages as demanded by the hierarchy criterion.

As detailed in section 3.1 of chapter 3, a further study in which young people are presented with pairs of statements differing in their level of epistemic maturity and are asked to select which of each of these they prefer is necessary if one wishes to properly test such a model's adherence to the hierarchy criteria. Short of this more direct test, some evidence, more conceptual than empirical, can be obtained through an examination of the scoring criteria employed in the present study. It was with this hierarchy criterion in mind that the structural interview was written in such a way as to oblige subjects to consider the full range of possible epistemic solutions and criteria for classifying subjects' responses by epistemic stage were developed. Given this interview structure, the hierarchy criterion is satisfied to the extent that subjects evidence a preference for higher stage responses and are consistently scored at a single stage. As was detailed in the discussion of the structure criterion above, such consistency was found in the present sample and this, along with the format of the interview procedure, provisionally argues in favor of the claim that the proposed model of epistemic development does satisfy the hierarchy criterion. With this in hand it is now possible to move on to consideration of the relation of young person's epistemic stage to their more general

cognitive developmental level and their place in the identity formation process.

Epistemic Assumptions and Formal Operations

The hypothesis under consideration regarding the nature of the relation between general cognitive developmental level and epistemic stage score (see chapter 2, section 2.3) is grounded in the orienting assumption that both are manifestations of the same underlying cognitive structure. By this understanding, changes in this underlying structure should be reflected in simultaneous changes in both general cognitive and epistemic developmental levels. This leads to the expectation that the correlation between epistemic stage and cognitive developmental level ought to be strong and positive. In addition, this correlation ought to be independent of age, as cognitive structural development is not understood to be caused by age or experience, despite being related to both. To test this hypothesis, zero-order correlations were calculated between age, cognitive developmental level, and epistemic stage (see Table 5). As anticipated, all of these relations were positive and statistically significant. (r = 0.54, p < 0.001 between epistemic level and cognitive level; 0.30, p < 0.01 between age and epistemic stage, and 0.45, p < 0.001 between age and cognitive level). When the effects of age are controlled by partialling them out of the correlation between cognitive level and epistemic stage, the correlation drops only minimally from 0.54 to 0.51 (an r value of that magnitude is still strongly significant, p < 0.001). This degree of independent relatedness is highly consistent with the structural interrelation hypothesised between epistemic and cognitive development.

The fact that these two measures are positively associated does not demonstrate, however, that the two stage models actually line up as predicted. As argued earlier, it was expected that the second order reflective ability generally thought to be definitional of formal operational thought should cost subjects their earlier realistic assumptions regarding the fixed relation between belief and experience and introduce in its place a constructivistic epistemic stance in which the knower is seen to somehow organize or constitute what is known. This hypothesized transformation leads to the prediction that those subjects who fail to evidence formal operational competence on traditional cognitive developmental tasks and who are instead categorized as concrete operational, ought to be found at epistemic level 0 (i.e., epistemic realism). By contrast, all those subjects who were clearly classifiable as formal operational, ought to appreciate that there is more to knowledge than simple experience and, as a consequence, should score at or above epistemic level 1 (dogmatism) in the epistemic stage model. The closest statistical analog that can be brought forward in support of the claim that both formal operations and non-realistic epistemologies are alternative manifestations of the same underlying structure is to demonstrate some measure of close agreement between tests intended to index each of these two constructs. Cohen's (1960) Kappa statistic optimally surves this comparative purpose.

Table 6 presents a 2 (cognitive level) by 2 (epistemic level) contingency table in which concrete and formal operational subjects are arrayed in terms of whether they evidence a level 0, realistic epistemic posture or some higher, constructivistic, epistemic stance. The results in this table clearly support the hypothesized relationship between

TABLE 6

Cognitive Developmental Level By Epistemic Level

Epistemic Level

Cognitive Developmental Level	Realism	Dogmatic, Skeptical, and Rational
Concrete Operational N = 12	7 (60%)	5 (40%)
Formal Operational N = 49	2 (5%)	47 (95%)

TABLE 6B

Cognitive Developmental Level by Epistemic Level

Epistemic Level

Cognitive Developmental Level	Realistic	Dogmatic	Skeptical	Rational
Concrete Operational	6 (50%)	4 (33%)	2 (27%)	0 (0%)
Formal Operational	2 (4%)	17 (35%)	22 (45%)	8 (16%)

N = 61

these two developmental constructs ($X^2(1)$=18.45, p < 0.001, Note: Yate's correction was applied to X^2 values derived from 2 X 2 contingency tables). These results reflect not only an association between these constructs but also strong point by point agreement (Cohen's Kappa, z=0.87, p < 0.01). The strength of this result is obviously due to the fact that virtually all of the formal operational subjects scored at or above epistemic level 1 (dogmatism).

What is not entirely consistent with the original prediction is that a number of concrete operational subjects scored above level 0 (realism) in the epistemic stage model. Two additional results mitigate the significance of this seemingly inconsistent finding. First, of the 5 concrete operational subjects scoring above stage 0, 2 were scored only marginally higher with a mixed stage score of 1(0) and only one of the remaining three scored as high as level 2. Second, in an effort to keep the age differences between the concrete and young formal operational subjects in the sample as small as possible, the lower grade boundary of the sample was set at grade 8. In this age range, young people clearly classifiable as concrete operational are in short supply as indicated by the number of transitional young people dropped from the study following initial screening (40 out of 110). This means that purely concrete operational young people are in the minority in the population from which the present sample was drawn. As a consequence, the most likely error to be made in assigning subjects to cognitive levels would be to include, in the concrete operational group, young people who were, in fact, in transition to or even capable of formal operational modes of thought.

Finally, with regards to the scoring of subjects' responses to the epistemic interview, the distinction between realism and dogmatism, while clear on conceptual grounds, is likely the most difficult one to make when scoring subjects' responses to the story problems. Quite young children often use the term "opinion" and may even oppose it to the term "fact" in ways that make it difficult to distinguish them from dogmatists. As previously suggested in the presentation of scoring criteria in section 5.5 of chapter 5, realists believe that opinions are introduced as informed guesses only after all of the simple truth has been extracted from the facts while the dogmatists believe that opinions intrude upon and distort the facts in ways that can only be sorted out with expert assistance. Given this potential scoring confusion, and the earlier characterization of dogmatism as an interim defense against the full implications of relativised skepticism, the relation between formal operations and a fully relativised epistemic stance ought to be clearer if dogmatic subjects are removed from Table 6. As may be seen in Table 7, this in fact was the case (X^2(1)= 17.35, p < 0.01, Cohen's Kappa = 0.714, p < 0.01).

Consideration of these points, along with the results presented in Tables 6 and 7, indicates that the same structural changes held to underpin the shift from concrete to formal operational modes of thought also may be seen to underlie the related shift from a realistic epistemic stance (level 0), to ones based on a constructivistic view of the knowing process (levels 1, 2, and 3). With this connection established, and with confirmation of the developmental stage qualities of the epistemological model, it is now possible to proceed towards a

TABLE 7

Cognitive Developmental Level By Epistemic Level

	Epistemic Level	
Cognitive Developmental Level	Realistic	Skeptical or Rational
Concrete Operational N = 9	7 (78%)	2 (22%)
Formal Operational N = 32	2 (6%)	30 (94%)

descriptive account of the relation found to obtain between these stages of epistemic development and outcomes in the identity formation process.

Identity Status Designation

On the basis of scoring criteria detailed in section 5.6, all 61 subjects were assigned to either a diffused, foreclosed, moratorium, or achieved identity status. Table 8 displays the distribution of those identity statuses by grade. No sex effects were observed in a 2 (Sex) by 8 (Identity subscales) repeated measure ANOVA on subjects' scores on the four status scales within each of the content domains. Once these status scale scores were converted to discrete identity status designations using the criteria outlined in section 5.6, males and females were found to be approximately equally distributed across the identity statuses (Mann-Whitney U-Test z=-0.307, p > 0.75). In addition, some previous research has suggested that females are more likely to be clearly assignable to a single identity status on the basis of their responses to the interpersonal items of the OM-EIS while males are more easily assigned to statuses on the basis of their responses to ideological OM-EIS items. However, among those subjects in the present sample who were assigned to an identity status on the basis of their responses within a single OM-EIS content domain, there was no greater tendency for females as opposed to males to be classified solely on the basis of their responses in the interpersonal domain (11 out of 17 females as opposed to 7 out of 11 males). The results as presented in Table 8 are therefore collapsed across sex.

TABLE 8

Grade By Ego Identity Status

Ego Identity Status

Grade	Foreclosed	Diffused	Moratorium	Achieved
8 (N = 27)	5 (19%) *	12 (44%)	6 (22%)	4 (15%)
10 (N = 15)	3 (20%)	2 (13%)	4 (27%)	6 (40%)
11, 12 (N = 19)	1 (5%)	5 (26%)	5 (26%)	8 (43%)

N = 61

* Row percentages are indicated in brackets.

As anticipated, the relation between grade and identity status is not strong. The correlation between age and identity status is only moderate (r = 0.34, p < 0.01). As detailed earlier, theoretic expectations regarding the appropriate developmental path to be taken through these statuses have never been particularly clear. It is in response to this lack of clarity that a central purpose of the present empirical effort has been to better articulate the developmental course by which identity issues are necessarily encountered and understood.

Cognitive Structural Development and Identity Formation

As previously detailed in section 4.1, a relationship between formal operational thought and Marcia's identity status typology has long been hypothesised (Rowe and Marcia, 1980). As already noted, however, the results of studies intended to demonstrate these relations have been equivocal, with some researchers finding and others failing to find a clear relationship between the attainment of formal operations and one's location within the identity status scheme. Most commonly it has been argued that the attainment of formal operational modes of thought should be a necessary prerequisite to entry into either of the "higher" moratorium or achieved identity statuses (Rowe and Marcia, 1980). By this debatable standard the present empirical effort fairs no better than its predecessors. As Table 9 indictates, there is no systematic tendency ($X^2(1)=1.66$) for concrete operational subjects to be found in the diffused or foreclosed statuses, or for formal operational subjects to be found in the moratorium and achieved statuses. Were this the extent of the results, little more could be said about the way in which cognitive developmental accomplishments map onto the identity status domain.

TABLE 9

Cognitive Developmental Level By Ego-Identity Status

Ego-Identity Status

Cognitive Developmental Level	Diffused or Foreclosed	Moratorium or Achieved
Concrete Operational N = 12	8 (67%)	4 (33%)
Formal Operational N = 49	20 (40%)	29 (60%)

As discussed in chapter 4 however, the failure on the part of previous investigators to demonstrate any compelling relation between formal operations and identity status can be assigned, in principle, to the fact that the achievement of formal operational thought has routinely been treated as a unitary or monolithic accomplishment. Nothing relates well to unity, and if identity development begins to differentiate at just that point in development where cognition is seen to converge on a single formal operational style of thought, then one of these domains can hardly be expected to predict the other. Clearly, unless or until formal operational thought is further subdivided into a sequence of succeeding substages, as was done in this research, no hope of establishing such a relation is possible. What will now be presented and discussed are the results of the empirical investigation into the underlap and overlap between the four part epistemic stage model proposed here and junctures within the identity formation process.

Epistemic Level and Ego-Identiy Status

Reporting of the results relevant to the relation between epistemic level and ego-identity status will proceed in three steps. First, results will be presented which are relevant to the global prediction that a full realization of the generic nature of epistemic doubt is a necessary prerequisite for advancement to either the moratorium or achieved identity statuses within the identity formation process. In addition, the series of hypotheses regarding the relation between specific epistemic levels and identity status designation will also be presented. Following this, the details of the cross-classification of the present sample by epistemic level and ego-identity status will be examined from two perspectives. Given that the orienting focus of this

research is cognitive developmental in nature, the first pass through the data arrayed in Table 10 will involve a separate examination of the range of responses to the OM-EIS subscales by subjects classified at each epistemic level. This will first be done using subjects' overall identity status designation and then again, capitalizing on the continuous nature of the OM-EIS subscales, by examining the identity status profiles of subjects at each epistemic level. Finally, because the ego-identity status approach to the adolescent identity formation process has a longer research history than the present epistemic model, it is instructive to look at how subjects at each ego-identity status in the present sample were classified on the epistemic developmental measure. The fact that adopting this additional perspective also entails taking a statistically redundant view of the data is hopefully outweighed by the likelihood that it will enhance the reader's appreciation of the relation between these two constructs.

The realization of epistemic doubt and ego-identity status: Global and specific hypotheses. To begin at the most general level, it was argued earlier (see chapter 4) that the detailed consideration of alternative life choices that define the moratorium and achieved statuses ought to require, at a minimum, some appreciation of the person relative nature of all knowledge that characterizes the level 2 and level 3 epistemic positions. By contrast, the easy assumption that there is a single correct answer to all of one's identity concerns that characterize identity diffused and foreclosed persons ought to rest upon the level 0 or 1 epistemic assumption that absolute answers to all questions are possible.

TABLE 10

Ego-Identity Status By Epistemic Level

	Epistemic Level			
Ego-Identity Status	Realistic	Dogmatic	Skeptical	Rational
Diffused N = 19	5	7	6	1
Foreclosed N = 9	3	6	0	0
Moratorium N = 15	0	3	11	1
Achieved N = 18	0	5	7	6

As Table 11 indicates, this general prediction is strongly supported in the present sample (X^2(1)=13.68, $\underline{p}$ < 0.001, Cohen's Kappa $\underline{z}$ = 0.51, $\underline{p}$ < 0.01). Of those subjects scored as realistic or dogmatic, 75% were also catagorized as identity diffused or foreclosed while 76% of those who indicated an appreciation of the the relative nature of the knowing process (i.e., skeptical or rational) were also classified as being in either the moratorium or achieved identity statuses. The 15 subjects in the error cells in Table 11, while of modest statistical relevance, do, nevertheless, constitute grounds for conceptual concern. Their existence is mitigated somewhat, however, by the fact that all of the moratorium and achievement status individuals who fall short of demonstrating a fully constructivistic epistemology did score at the dogmatic epistemic level (rather than the realistic) and all but one of the foreclosure or diffusion subjects who evidenced a higher than expected level of epistemic development were scored as skeptical (rather than rational). In short, those subjects who failed to conform to the hypothesized relation between epistemic and identity levels did fall short of those expectations in the most minimal ways possible.

More specifically, it was hypothesized that epistemic realists would be scored either as identity diffusions or foreclosures; dogmatists were expected to score as foreclosed; skeptics as in either the diffusion or moritorium statuses; and the rationalists as being in the achieved status. As can be seen from an inspection of Table 10, these hypotheses were supported by 8/8 realists (binomial probability $\underline{p}$ < 0.001), 6/21 dogmatists (not significant), 17/24 skeptics ($\underline{p}$ < 0.001), and 6/8 rationalists ($\underline{p}$ < 0.001). If, for the reasons cited above (see section 6.3), the dogmatists are dropped from consideration when

TABLE 11

Epistemic Level By Ego-Identity Status

Epistemic Level	Ego-Identity Status	
	Diffused or Foreclosed	Moratorium or Achieved
Realistic or Dogmatic N = 28	75%	25%
Skeptical or Rational N = 33	24%	76%

conducting the overall tests of these hypotheses, more than three quarters of the subjects show precisely that identity status predicted for them by the epistemic model which, as the reported probabilities attest, is very unlikely to occur on the basis of chance alone.

In the remainder of this section, the findings displayed in Table 10, showing the four identity statuses arrayed against the four epistemic stages, will be descriptively considered in the additional two ways described earlier. First, in light of earlier difficulties in uniquely assigning individuals to a single identity status, Marcia (1980) has suggested that persons might be better viewed as expressing sentiments or exhibiting features characteristic of two or more identity statuses. That is, rather than describing a typology of mutually exclusive styles with which people approach problems related to identity formation, it has been proposed by investigators working in this field that the identity status scheme might better be viewed as a framework for describing interrelated classes of thoughts and interpersonal behaviours. In this manner, individuals might be best characterized, not by a single identity status, but by the relative proportion of their responses and behaviours which are reflective of concerns unique to each identity status. Following this reasoning and in an effort to shed additional light upon the underlap and overlap between these two descriptive systems, the average identity status profile characteristic of subjects at each epistemic stage was examined. Finally, the implications of the present data for the identity status approach to the adolescent identity formation process will be investigated by focussing on each identity status in turn and observing where subjects classified in that status fall within the epistemic stage model. The reader should

be aware that the analyses to be reported upon below were undertaken purely for exploratory purposes. The use of muliple apriori comparissons in the first set of analyses described below, the use of the Newman-Keuls post-hoc procedure in the second, and the fact that the two analyses represent two passes through the same data all contribute to an elevation of the experiment-wise error rate above the conservative 0.05 level. While such an increased experiment-wise error rate is acceptable in the present circumstances, given the exploratory nature of the analyses to be reported upon below, the results should be viewed primarily as an illustrative guide to future research.

Ego-identity status within each epistemic level. As described earlier, Marcia (1966) and Leiper (1981) have argued that young persons' solutions to the problems of identity formation are best viewed as a series of continuous movements through the various identity statuses. Adams' identity status scales, as employed in this study, are especially amenable to this sort of more continuous treatment of the issue of identity status membership. In the service of better understanding the manner in which young persons at each epistemic stage approach the task of identity formation and commitment, standardized identity status scale score profiles were created for all subjects. This was accomplished by converting subjects' scores on each identity status scale to standard score form using the mean and standard deviation of the entire sample of 61 subjects on each identity status scale. These standard scores were then averaged across subjects within each epistemic level to produce an average or prototypic identity status profile for each epistemic level.

Planned comparisons were conducted to test several specific expectations regarding the unique patterning of identity related

sentiments or beliefs held by representatives of each epistemic level. Figure 1 shows these average profiles for each epistemic level based on standardized scale scores and Table 12 contains the means for each group on each status scale.

As was predicted, skeptically relativised subjects (level 2) scored significantly higher on the moratorium scale ($\underline{t}$(57)=2.07, $\underline{p}$ < 0.05) than did subjects at all the other epistemic levels combined. Also consistent with earlier predictions, rationalists (level 3) scored higher on the identity achievement scale than did subjects at other epistemic levels ($\underline{t}$(57)= 2.31, $\underline{p}$ < 0.05). Finally, as expected, realistic and dogmatic young people (epistemic levels 0 and 1) were indistinguishable in their preferences for items on the diffusion and foreclosure scales and, over the two scales, preferred such items to a significantly greater extent than did epistemically relativised skeptics or rationalists (levels 2 or 3) ($\underline{t}$(57)=2.07, $\underline{p}$ < 0.05). This difference is primarily due to differences in foreclosure scale scores (levels 0 and 1 vs levels 2 and 3, t(57)=-4.24, $\underline{p}$ <0.001). While the differences among average scores on the diffusion scale are in the predicted direction (see Figure 1), they are of insufficient magnitude to reach significance. This may well be a function of the present sample being composed of high school students who, despite being cognitively capable of maturely considering identity issues, have yet to encounter those societal pressures commonly brought to bear on high school graduates to seriously consider their own future. As a consequence, the identity diffused sentiment of "not having thought about it yet" contained in the bulk of the OM-EIS diffusion scale items is likely to lead to their

TABLE 12

Epistemic Level By Ego-Identity Status Scale Scores[*]

Ego-Identity Status Scale Scores

| Epistemic Level	Foreclosed	Diffused	Moratorium	Achieved
Realistic N = 9	40.2^a (0.973)	51.0^a (0.345)	54.7 (-0.229)	55.9^a (0.474)
Dogmatic N = 20	33.9^{ab} (0.332)	48.4^a (0.030)	53.5 (-0.362)	61.8 (0.113)
Skeptical N = 24	24.8^{bc} (-0.586)	47.3^a (-0.096)	59.5 (0.302)	59.2 (-0.146)
Rational N = 8	29.0^c (-0.164)	46.6^a (-0.176)	59.1 (0.261)	67.5^b (0.689)
Means	30.6	48.1	56.8	60.6

* Standardized scores based upon identity status means are reported in parentheses.

Note: Within columns entries bearing different superscripts (i.e., [a], [b], or [c]) are significantly different at the 0.05 level based upon post-hoc testing.

FIGURE 1

Standardized Ego Identity Scores

for each Epistemic Level
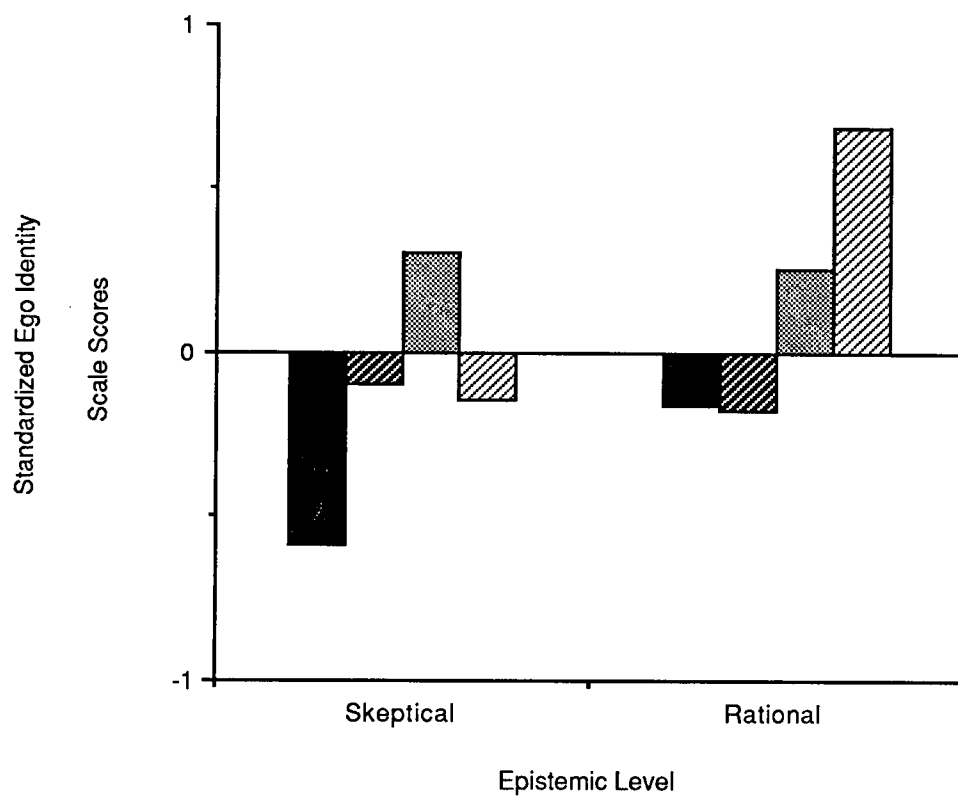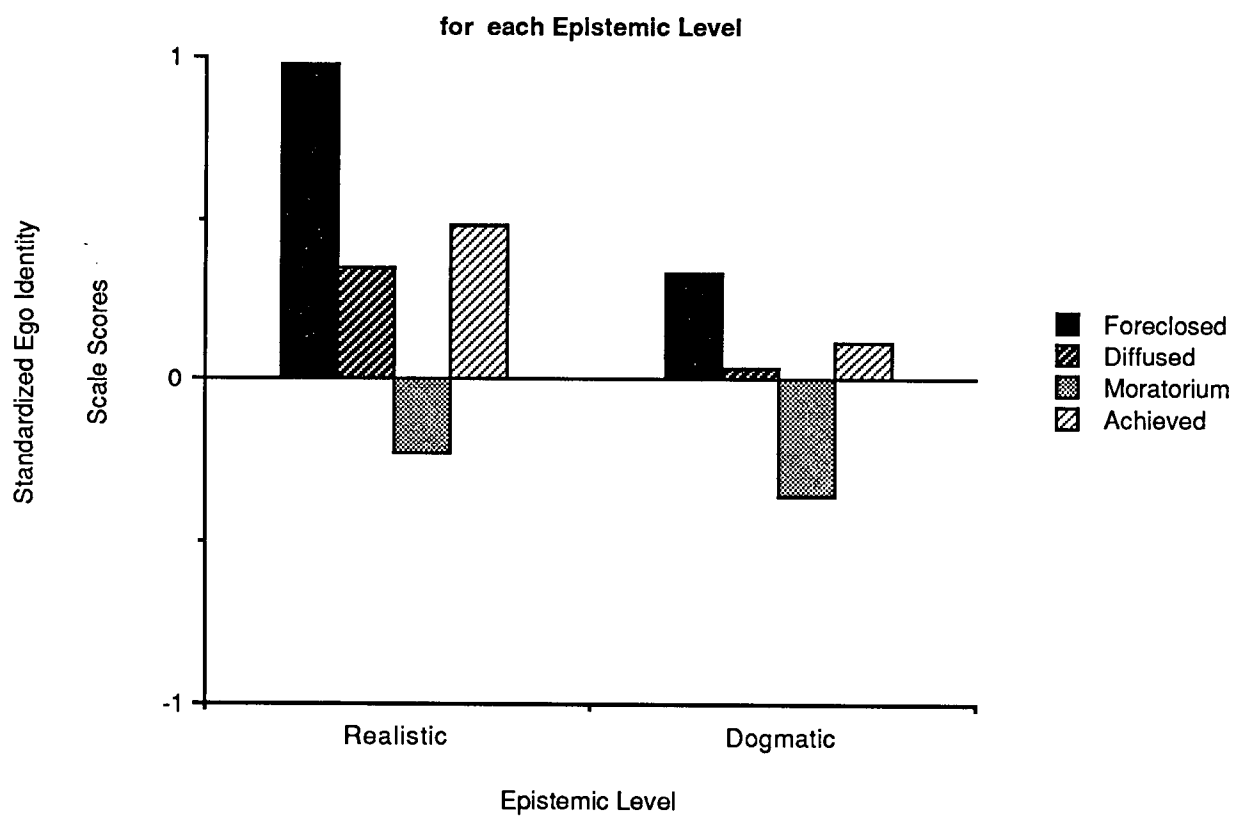
being endorsed by a cross-section of young people at each epistemic level.

Advancing the investigation of identity status profiles a step further, the relative level of agreement with items on the identity scales may be examined. This provides another perspective on how young people at each epistemic stage view the issue of identity. The expectation is that the preferential ordering of the identity scales should be different at each epistemic level in ways which reflect how young people at each stage approach problems of certainty and commitment. Because of the relatively small numbers of subjects found in the present sample to be at the realistic and skeptical epistemic levels (0 or 3) it was decided to collapse the realistic and dogmatic catagories (levels 0 and 1) and the skeptical and rational catagories (levels 2 and 3) and to proceed with a comparison between young people within pre- and post-relativised epistemic postures.

A 2(epistemic level) by 4(identity status)analysis of variance was conducted with the standardized scale scores for the four identity statuses being treated as within-subject repeated measures (see bracketed standardized scores in Table 12). The main effect for epistemic level was not significant ($\underline{F}(1,59)= 0.97$). The main effect for identity was also non-significant, automatically, due this time to the standardization of the identity scales. The epistemic level by identity interaction was, however, significant ($\underline{F}(3,177)= 8.06$, $\underline{p} < 0.001$). What may be observed in this interaction (see Table 13 and Figure 2) is that the preferential ordering of the identity status scales is reversed for relativised compared to the non-relativised subjects. Analysis of the simple main effects of relative identity

TABLE 13

Epistemic Level By Standardized Ego-Identity Status Scale Scores[*]

	Ego-Identity Status Scale Scores			
	Foreclosed	Diffused	Moratorium	Achieved
Realistic or Dogmatic N = 29	0.531^b	0.128^a	-0.321^a	-0.069^a
Skeptical or Rational N = 32	-0.481^a	-0.116	0.292^b	0.063

* Ego-Identity scores were standardized using the mean and standard deviation for each identity status scale, actual means for each scale are shown in table 12.

Note: Within rows entries bearing different superscripts (i.e., ^{a}, ^{b}, or ^{c}) are significantly different at the 0.05 level based upon post-hoc testing.

FIGURE 2

Epistemic Level By

Ego Identity Status Interaction
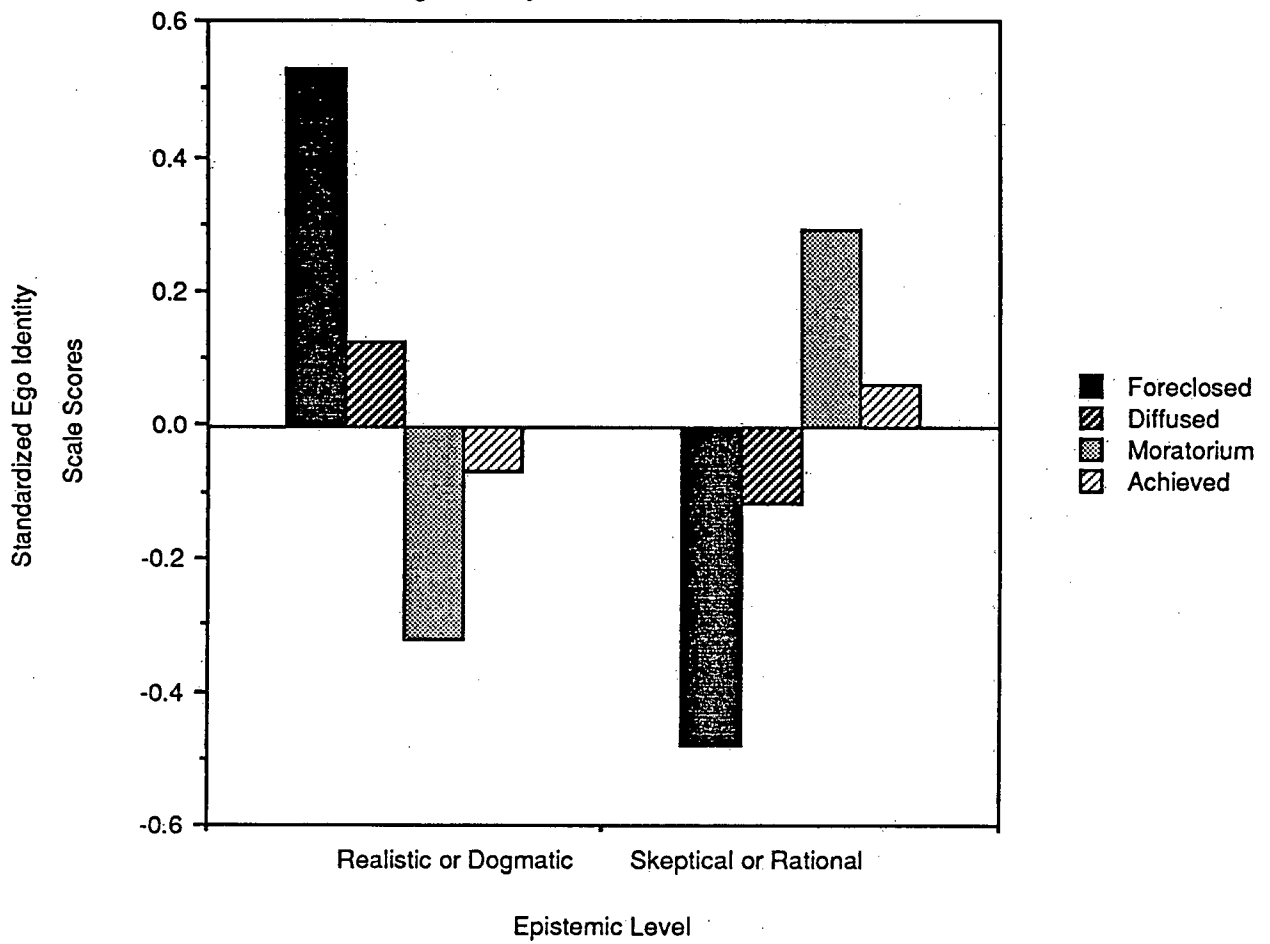
scale scores at each epistemic level support the existence of the trend

seen in Figure 2. (At levels 0 and 1, F(3,177)= 4.43, p < 0.01, at

levels 2 and 3, F(3,177)= 3.64, p < 0.05). Realistic and dogmatic

subjects (epistemic levels 0 and 1) preferred foreclosure items to all

other kinds of items (post hoc tests: foreclosure vs moratorium, p <

0.01 Newman-Keuls, foreclosure vs achieved, p < 0.05 Newman-Keuls, and

foreclosure vs diffusion, p < 0.01, Newman-Keuls). The preferential

ordering suggested by these results is foreclosure, diffussion,

achievement, and moratorium. The order suggested by the responses of

skeptical and rational subjects (epistemic levels 2 and 3) is the

reverse of this and is supported by the significantly greater preference

for moratorium over foreclosure scale items (post hoc test, p < 0.05

Newman-Keuls).

The range of epistemic levels found within each ego-identity
status. As proposed, in the remainder of this section the relations
between epistemic level and ego-identity status will be examined again
but this time from the perspective of each of the four identity
statuses.

As may be seen in the second row of Table 10, all of those young
people who scored as foreclosed were also categorized either as
epistemic realists (level 0) or dogmatists (level 1). The common
feature of both of these epistemic postures is the belief that some
(level 1) or all (level 0) of what one knows is a direct byproduct of
uninterpreted raw experience. In identity formation terms this
translates to a belief that all of life's important questions have
definite answers, some of which are already known by one's parents or
others and that one need only discern who it is that is in possession of
these right-minded conclusions.

In contrast to the foreclosed subjects, the lion's share (73%) of
those subjects found in the moratorium status were scored as skeptics
(epistemic level 2). The moratorium status' definitional sense of
crisis and attendant search for appropriate grounds for commitment
obviously parallels the skeptic's relativistic appreciation that they
lack any externally constituted grounds for deciding who or what is
right.

The distribution of identity diffuse subjects across the top row of
Table 10 is consistent with several past suggestions (Marcia, 1966,
Orlofsky et al., 1973, and Podd, 1972) that there may be more than one
type of identity diffusion. That the majority (63%) of the identity
diffused subjects were found at the realistic and dogmatic epistemic

levels (0 and 1) as expected. A correlary to the level 0-1 identity foreclosed subjects' belief that they know what is right for them, is the epistemically equivalent belief that there is no need to become exercised about matters of identity formation for the reason that concrete answers to such problems are forthcoming.

The identity diffused subjects who scored as epistemic skeptics may be assumed to be diffusions of a different sort. In contrast to their level 1 counterparts, level 2 subjects have adopted an epistemic stance that includes an appreciation of the person-relative nature of knowledge. As discussed earlier (see chapter 4), young people may react to this epistemic insight by working towards goals and commitments that are chosen on other than rational grounds, and thus appear either in the moratorium or achieved statuses, or, conversely, may skeptically decide that they lack the grounds to make any commitments at all. Such skeptical identity diffused young people may thus exhibit the sort of commitment to not making any commitments (Broughton, 1978) that has been variously described as alienated achievement (Orlofsy et al., 1973) and post-crisis diffusion (Podd, 1972).

Two additional findings are consistent with this diversified account of the diffused status. First, only one rational (level 3) subject was found to be in the diffusion status. Clearly the ability to proceed on rational grounds in matters of fact and belief also provides such young persons with the warrant to make those identity relevant choices and commitments which excludes them from the ranks of identity diffusion.

Further evidence for this differentiated account of the diffusion status is the finding that when the 8 identity scales (4 statuses in each of the ideological and interpersonal domains) were factor analysed,

to confirm that scales intended to tap the same statuses loaded on the same factor, only the diffusion scale items failed to define their own factor. Instead, the ideological diffusion scale loaded strongly on the foreclosure factor (see Table 3) while the interpersonal diffusion scale loaded with approximately equal weight on both the foreclosure and moratorium factors. This factor structure would not be easily interpretable were it not for the additional insights provided by knowledge of subjects' epistemic stage scores. What this indicates is that the diffusion scale items, which reflect a lack of commitment in any identity relevent area, are endorsed for different reasons, both by those who believe that they will discover what is best for them when the need arises (i.e., realism and dogmatism) as well as by more epistemically sophisticated skeptics (i.e., level 2) who are equally unprepared to make identity choices, but on the different grounds that they are epistemically unequipped to do so.

As the last row of table 10 indicates, there are young people at all three post-realistic epistemic stages (i.e., levels 1, 2, and 3) who were also found in the identity achieved status. The fact that these groups of identity achievers represent a small subset of an already small sample of young people means that post-hoc comparisons among them will be unlikely to yield significant results and did not in the present sample. What the range of epistemic stage scores within the achieved status may suggest, however, is that young people at each epistemic level can endorse the same achievement scale items for a variety of different reasons. It is possible that those achievers who scored as dogmatists are proceding under the assumption that they have found what is absolutely right for them. Their being classified as achieved rather

than foreclosed, where such externally focussed individuals are routinely scored in the Marcia Interview Procedure, may be related here to method variance introduced by the use of a paper-and-pencil procedure for indexing identity status. It is likely that the results of a standard Marcian Interview would reveal the externally guided nature of the dogmatists' search for direction. Consistent with this characterization of those subjects jointly categorized as identity achieved and dogmatic is the tendency (non-significant due to the small sample size) for the dogmatic identity achievers to score higher on the foreclosure scale (32.0) than either the skeptical (level 2) or the rational (level 3) achievers (26.0 and 29.2). Adams' identity questionnaire (OM-EIS) fails to identify young people who are foreclosed upon values or lifestyles derived from persons other than their parents. It is possible that the 5 dogmatic (level 1), identity achieved young people in the present sample are actually foreclosures of this sort, though this is somewhat speculative and must await confirmation using a full Marcian identity interview.

Those subjects in the identity achieved status who were also classified as skeptics (epistemic level 2) more closely fit the standard definition of the identity achieved individual as one who has experienced and passed through an identity crisis. The implication of their being found to view matters of fact and truth in a relativised manner is that they may have skeptically made their identity commitments on idiosyncratic, non-rational grounds. If this finding is replicable in a larger sample, it could help to account for the perplexing results of Marcia's longitudinal follow-up of his original identity status sample (1976) in which a number of subjects who had been originally

classified as identity achieved were found, on follow-up 6 years later, to be in the foreclosed status. The sorts of non-rational resolution strategies espoused by skeptical epistemic relativists represent ways of satisfying the obligation to make certain life commitments <u>within</u> a skeptical perspective without actually settling upon ways of proceeding rationally in an uncertain world. By these lights, it would not be surprising, given that dogmatism and skepticism are taken to occupy opposite sides of the same relativised epistemic coin, to find that at some later date a portion of such skeptical identity achievers had adopted, or foreclosed upon, dogmatic strategies for maintaining certainty and warranting their career and other life choices.

Finally, those subjects jointly classified as epistemic rationalists (level 3) and as being in the achieved identity status, represent prototypic identity achievers as defined within the identity status typology in that they have experienced crises of identity and epistemic certainty and have passed through them, not by dismissing them but by making commitments despite them. The expectation is that such individuals would very likely continue to be found in the identity achieved status if tested at a future date.

Summary of Results

Before turning to the task of drawing out the conclusions to which the preceeding findings lead, a brief summary of the results is in order.

First, with regard to the proposed epistemic stage model, it was found, as expected, that epistemic level was related to age, with subjects in higher grades tending also to be found at higher epistemic

levels. Second, the model's performance was evaluated against the standard structure, sequence, and hierarchy criteria demanded of strict stage models. In so far as it is possible to evalute these criteria within the context of a cross-sectional study, the epistemic model proposed here did receive strong support. With this evidence in hand it was then possible to move on to a consideration of the relation between each subject's epistemic level and their performance on other measures of cognitive development.

In this context, it was first demonstrated that, as predicted, there was a strong positive correlation between cognitive and epistemic level and that this correlation remained strong even when the effects of age were partialled out. More specifically, clear support was found for the key expectation that, within measurement error, all subjects who scored as formal operational also evidenced a stage of epistemic function beyond simple realism. In addition, when subjects who scored as epistemic dogmatists were removed from the analysis on procedural grounds, the co-occurrence of formal operational modes of thought and post-realistic epistemic stances was even clearer. With the connection between cognitive development and epistemic level established it was possible to move on to a final set of considerations regarding the predicted relation of these constructs to the ego-identity formation process.

Consistent with the findings of other studies, no significant relation was expected or found between grade and ego-identity status and the correlation between age and identity status was not strong.

What was hypothesized and generally supported by the data was that both epistemic realists and dogmatists, by virtue of their belief that

certain knowledge is a necessary prerequisite for making decisions, would be over-represented in the ranks of the identity diffusions and foreclosures. Similarly, additional support was found for the expectation that epistemic skeptics and rationalists would score in the moratorium or achieved identity statuses. Discounting the dogmatists who, for reasons elaborated above, were most likely to be misclassified, over three quarters of the subjects in the present sample were scored within the identity status or statuses predicted for them on the basis of their epistemic level. All of the epistemic realists were scored either as identity diffused or foreclosed while 71% of the epistemic skeptics were scored as either identity diffused or in the moratorium status. Finally, 75% (all but 2) of the epistemic rationalists were scored within the identity achieved status.

It is clear from these results that there are both substantial areas of overlap and intriguing areas of underlap between the ego-identity status account of the adolescent identity formation process and the account of these and other related issues provided by the epistemic developmental model developed in this thesis. In the brief discussion section which follows the implications and limitations of these empirical findings will be drawn out and directions for future research will be charted.

CHAPTER 7: DISCUSSION

In this final chapter, conclusions arising from the results will be discussed, some limitations of the empirical portion of this thesis will be addressed, and the broader implications and future research directions suggested by these findings are considered.

The epistemic model that was proposed and tested in this study received support of several sorts. First it is clear that, on the basis of their responses to the Epistemic Doubt Interview, subjects may be reliably and exhaustively classified as holding to one of the four tacit epistemic postures outlined in the model. It is also clear that, at least in so far as may be demonstrated with cross-sectional data, the levels within the proposed model conform to the usual criteria of a strict developmental stage theory.

Of perhaps greater relevance, in light of the conceptual goals of this study, is the finding that the emergence of generic doubt does coincide, as predicted, with the initial achievement of formal operational modes of thought. This result lends credence to the claim that both formal operations and epistemic doubt represent alternative expressions of the same underlying cognitive-structural transformations. This demonstration helps to elaborate our understanding of the nature of formal operations in novel and potentially informative ways. The onset of formal operations has commonly been understood as an unremittingly positive achievement. The results of this study, however, suggest that this structural shift also carries with it a range of unsettling consequences, epistemic doubt being central among them. More specifically, what these results suggest is that prior to the onset of formal operational thought young people maintain a realistic epistemic

position with regards to certainty and truth and confidently believe that objective knowledge is potentially available to all. With the onset of formal operational thought, however, young people begin to realize that knowledge is an interpretive achievement rather than an automatic byproduct of experience with objective reality. As anticipated, this contructivistic insight appears to precipitate a turn to either dogmatic, skeptical, or rational strategies for coping with epistemic doubt.

While final determination of the developmental ordering of these alternative response strategies awaits a longitudinal investigation, the results of the present study clearly indicate that young people initially respond to epistemic uncertainty either by adopting a skeptical stance or by defensively retreating into a dogmatic posture. Only after the implications of emerging epistemic doubt have been fully realized, and a skeptical stance adopted, does it appear possible for adolescents to consider alternative, rational, decision making strategies.

As an expansion of the notion of formal operations, the proposed epistemic model has the advantage of introducing 3 ordered levels of funtioning in the place of a single monolithic achievement. Previous attempts to relate the identity formation process to the simple presence or absence of formal operational thought have been largely unimpressive (see chapter 4). Unpacking the category of formal operations into a better differentiated set of epistemic levels, as was accomplished in this thesis, made possible a more detailed exploration of the connections between cognitive development and identity formation.

As the results reported upon in section 6.7 clearly indicate, the epistemic developmental model does in fact map onto the identity status scheme, with the majority of predicted points of overlap clearly demonstrated in this study. As predicted, the results indicated that subjects scored as epistemic realists, and who believe that absolute certainty is or will be attainable, do indeed generalize that belief to matters of identity and were consequently scored either as identity diffused or foreclosed. Similarly, epistemic sceptics, who by their responses on the Epistemic Doubt Interview demonstrated a lack of confidence in the prospect of ever knowing anything with certainty, expressed similar sentiments through their responses to the OM-EIS and were virtually all classified either as identity diffused or in the moratorium status. The epistemic rationalists, characterized by their belief that absolute certainty need not be a necessary component of rational decision making, were almost exclusively found to also be in the identity achieved status indicating that they had successfully applied their epistemic insight to matters of identity. The only prediction that was less than completely borne out concerned the epistemic dogmatists and the expectation that they would all be scored as identity foreclosures. While dogmatists were in fact the only epistemic non-realists to score as foreclosed, they were also represented in each of the other three identity statuses. Although partially explained by the fact that, by its very nature, dogmatism is understood to be a kind of retreat into realism and as a consequence can not always be reliably distinguished from this earlier epistemic posture, this finding clearly indicates a need for a more thorough

explication of the thought processes of such dogmatically defended
individuals.

What is suggested by the demonstrated areas of overlap between
these two explanatory models is that the meaning of the various identity
statuses proposed by Marcia and others could be clarified further if the
same subjects were further subdivided by epistemic level. Before such a
step is taken, however, it would be useful to first examine more of the
real world correlates of young persons' epistemic developmental level.
Before returning to this and other implications of this study, however,
several limitations of the present study must be addressed.

Limitations

Several possible limitations of the empirical portion of this study
will be dealt with in turn. These include the potential confound of both
cognitive and epistemic level with general intelligence or verbal
fluency, the restricted (at least in life-span terms) age range of the
present sample, and the validity of the Epistemic Doubt Interview
procedure.

The relation between intelligence, as generally conceived of within
the psychometric tradition of IQ testing, and cognitive developmental
level, as understood by structuralists such as Piaget, is complex and
perhaps even incommensurate (Kuhn, 1970). Still, it is claimed by some
that much of what those working in the Piagetian developmental tradition
would ascribe to advances in cognitive developmental level and, by
extension, to epistemic level, are merely reflections of individual
differences in intellectual level or verbal fluency. While it is a goal
of future investigations to investigate and control for this relation
directly, at least one finding serves to mitigate the possible relevance

of intelligence to the findings of the present study. A rough accounting

of the relative lengths of the Epistemic Doubt Interview protocols for

subjects scored at each epistemic level was generated and the result

indicates that there was no systematic tendency for subjects at one

epistemic level to simply have more to say than subjects at any other

level. To the extent that verbal fluency can be taken as an indirect

indicator of general intelligence, there is, then, no indication in the

present data of a tendency for subjects at one epistemic level to be any

more psychometrically able than subjects at any other.

A second potential limitation of the present results also relates

to the nature of the subject population studied. While there were

compelling reasons for selecting an exclusively high school aged sample,

the course of epistemic development, as it is understood here, is

thought to extend both back into childhood and forward into adulthood.

The study sample does, therefore, represent a seriously truncated slice

of the life-course. Certain potential critics who have focussed their

attention upon identity formation in late adolescence and early

adulthood will consequently think that the present sample is too young,

while others, primarily interested in the first emergence of epistemic

concerns will judge it to be too old. The decision to focus upon the age

group studied here does have its own rationale, however.

In the service of conducting the clearest possible test of the

structurally based predictions advanced in this thesis, only those

subjects who could be clearly classified as concrete or formal

operational were included in the empirical portion of the study. It

would be instructive, however, to administer the Epistemic Doubt

Interview to a group of still younger, more typical, concrete

operational subjects. This would have the potential advantage of more clearly distinguishing epistemic realists from defended epistemic dogmatists and would aid in sorting out the range of epistemic responses shown by subjects scored as identity foreclosures. Other evidence suggests that it would be equally instructive to test still older subjects.

Despite the present evidence indicating that epistemic development and its identity-relevant implications have roots at earlier ages than had previously been anticipated, it is equally clear that neither epistemic development nor the identity formation process are complete by the end of the high school years. While it remains to be seen whether the Epistemic Doubt Interview would reveal more epistemic skeptics or rationalists beyond the high school years, it may also be that the differing socio-cultural circumstances of college aged, as opposed to high school aged, young people could have a strong, potentially regressive, effect on such young peoples' epistemic reasoning. Perry's model assumes that young people enter the college years in either a dualistic (realistic) epistemic stance or having recently abandoned one. The model advanced and tested in this thesis, by contrast, indicates that young people may leave such an epistemically realistic posture behind in their junior high school years and adopt, at least a rudimentary, epistemically rational position prior to leaving high school. This suggests that what Perry and others (Kitchener and King, 1981) may be tracking as they mark college students movement through positions of epistemic dogmatism and skepticism (relativism) is actually the students' second pass through those developmental levels. High school students who have realized that a rational approach enables them

to proceed without absolute certainty, may be forced back to earlier dogmatic or skeptical positions when confronted with the paradigm differences and disagreements which are characteristic of academic rationalism. A study of older, college aged youth, would help to clarify the nature of this point but a longitudinal study which follows young people through the high school and college years is necessary to resolve it.

Finally, related to this issue of the epistemic facility of high school students, is the question of why the present study succeeded in finding all epistemic levels represented at the high school level when others have not. Beyond the fact that few other studies have even attempted to find evidence of post-realistic epistemic development in the high school years, the method used in the Epistemic Doubt Interview turned upon the use of issues which were of particular relevance to high school aged subjects. Whenever one attempts to address the question of certainty regarding a particular issue, the questions one asks have relevance only to the extent that they focus upon issues that are live, rather than dead (James, 1958) for that individual. Clearly the ideal way to accomplish this would be to fully ipsitize the epistemic interview procedure by asking each subject questions about distinct events in their personal lives. As an approximation to this logistically unobtainable ideal, issues were included in the Epistemic Doubt Interview on the basis of their potential relevance and familiarity to the high school subjects' studied. At least in part, the fact that this study identified a large number of post-realistic thinkers within a high school population can be laid at the door of this procedural change. This suggests that the form of the Epistemic Doubt Interview should be

retained in future studies but that the issues addressed within it ought to be changed where necessary so that they remain topical for the subjects being questioned.

Future Directions

With these limitations in mind, attention is now directed to the implications of this study for future conceptual and empirical work in the domain of adolescent social-cognitive adaptation. This will begin with a brief discussion of the likely place of the identity formation process within the larger context of epistemic development and closes by redeeming the prospect that adolescence must still be considered a distinct period of the life-span worthy of special empirical attention.

The attempt, in this thesis, to relate epistemic development and the ego-identity formation process was driven by two related agendas. The first was to establish epistemic development as a further expression of the same cognitive structural shift already understood to underpin the movement from concrete to formal operational modes of thought. This was done in order to provide a bridge by which cognitive development might be shown to have relevance for the ego-identity formation process. The results of the empirical portion of this thesis have clearly shown that epistemic level and not the simple presence or absence of formal operational thought is the appropriate surface manifestation of cognitive structural advancement to relate to ego-identity status. The purpose of this, however, has not been to place epistemological development prior to identity formation, nor has it been to put epistemic concerns forward as mediating variables between identity formation and other more general benchmarks of cognitive advancement (i.e., formal operations). The purpose has been, rather, to better

locate adolescents' questioning and concerns about matters of their personal futures in the broader context of how such young people approach matters of choice and certainty more generally. This broader context includes, but is in no way exhausted by, concerns over ones occupational or interpersonal future. The need for such an expanded focus has already been recognized by identity theorists such as Grotevant (Grotevant, Thorbecke, and Meyer, 1982) and Adams (Bennion and Adams, 1986). It is reflected in the recent elaboration of what are considered as issues of relevance for identity development. The effect of this expansion, while in some sense appropriate, has been to obscure why it is that measures which inquire into religious, philosophical, and interpersonal concerns ought to be considered to be measures of identity at all. The alternative being proposed here, which involves focusing upon epistemic development in all of its content domains, including issues of relevance for the identity formation process, would greatly expand, rather than merely fine-tune, our understanding of the life long course of these and other concerns.

The foregoing argument for the consideration of a broader epistemic context and life-span focus for matters of importance for identity formation should not be construed as an attempt to strip adolescence of its special status as a recognizably distinct phase of the life cycle. Adolescence is bracketed by childhood on one side and adulthood on the other. When the epistemic assumptions of younger, grade school children are considered, it is clear that they are all thorough-going epistemic realists. On the other hand, when one considers the range of epistemic options which appear to be recognized by and within adult society there appears to be cultural support only for epistemic postures which allow

one to get on with one's life. There are liberals and conservatives, Democrats and Republicans, and open and closed minds (Rokeach, 1960). There are, however, no middle positions in adulthood -- no adult skeptics. Relativism or skepticism is the least tenable epistemic position to be in, as even dogmatism, despite its negative connotations, has considerable cultural support. The skeptic's inability to proceed knowledgably represents an unsteady fulcrum from which to direct one's life. Societal recognition of this as a legitimate, though transient, position is at the core of the special social status accorded adolescence. Skepticism beyond adolescence is not tolerated, except perhaps in academia, and impending adulthood demands that young adults make a stand which necessitates either a retreat into dogmatism or, more optimally, a rational stand. Just as the moritorium ego-identity status is considered a transient luxury of adolescence, so too is skepticism.

References

Abraham, K.G. (1983). The relation between identity status and locus of control among rural high school students. Journal of Early Adolescence, 3, 257-264.

Adams, G.R., Shea, J.A., & Fitch, S.A. (1979). Toward the development of an objective assessment of ego-identity status. Journal of Youth and Adolescence, 2, 223-237.

Adams, G.R., Ryan, J.H., Hoffman, J.J., Dobson, W.R., & Neilson, E.C. (1984). Ego identity status, conformity behavior, and personality in late adolescence. Journal of Personality and Social Psychology, 47, 1091-1104.

Archer, Sally L. (1982). The lower age boundaries of identity development. Child Development, 33(6), 1551-1556.

Archer, Sally L. (in press, 1987). Adolescent ego identity: Scoring criteria and other methodological considerations. In J.E. Marcia, A.S. Waterman, & D. Matteson (Eds.), Handbook of identity research. Hillsdale, N.J.:Erlbaum.

Arlin, P.K. (1975). Cognitive development in adulthood: A fifth stage? Developmental Psychology, 11, 602-606.

Arlin, P.K. (1977). Piagetian operations in problem finding. Developmental Psychology, 13, 247-298.

Arlin, P.K. (1978). The application of Piaget's theory to instructional decisions (Report No. 78:1), Vancouver, Canada: Educational Research Institute of B.C.

Arlin, P.K. (1984). Adolescent and adult thought: A structural interpretation. In M.L. Commons, F.A Richards, & C. Armon (Eds.), Beyond formal operations: Late adolescent and adult cognitive development (pp. 258-271). New York: Praeger.

Ausubel, D.P. & Ausubel, P. (1966). Cognitive development in adolescence. Review of Educational Research, 36, 403-413.

Basseches, M. (1984). Dialectical thinking and adult development. Norwood: Ablex.

Baumeister, R.F., & Tice, D.M. (in press). How adolescence became the struggle for self: A historical transformation of psychological development. In J.Suls & A.G. Greenwald, (Eds.), Psychological Perspectives on the Self, 3, Hillsdale, N.J.: Erlbaum.

Bennion, L.D. & Adams, G.R. (1986). A revision of the extended version of the Objective Measure of Ego Identity Status: An identity instrument fo use with late adolescents. Journal of Adolescent Research, 2, 1-15.

Berger, P. & Luckman, T. (1967). The social construction of reality. Harmondsworth: Penguin.

Bernstein, R, (1983). Beyond objectivism and relativism. Philadelphia: University of Pennsylvania Press.

Berzonsky, M.A., Weiner, A.S., & Raphael, D. (1975). Interdependence of formal reasoning. Developmental Psychology, 11, 258.

Blasi, A., & Hoeffel, E.C. Adolescence and formal operations. Human Development, 17, 344-363.

Bosma, H.A. (1985). Identity development in adolescence. Unpublished doctoral dissertation, University of Groningen, Terheyl.

Bourne, E. (1978 a). The state of research on ego identity: A review and appraisal. Part I. Journal of Youth and Adolescence, 7, 223-251.

Bourne, E. (1978 b). The state of research on ego identity: A review and appraisal. Part II. Journal of Youth and Adolescence, 7, 371-392.

Boyes, M.C. (1982). The development of young children's understanding of knowledge in others. Unpublished Master's Thesis, University of British Columbia, Vancouver, Canada.

Boyes, M.C. & Chandler, M.J. (1984, June). Children's changing conceptions of the distinctiveness of self. Paper presented at the annual meeting of the Canadian Psychological Association, Ottawa.

Braine, M. (1978). On the relation between the natural logic of reasoning and standard logic. Psychological Review, 85, 1-21.

Broughton, J.M. (1975). The development of natural epistemology in the years 10-16. Unpublished doctoral dissertation, Harvard University.

Broughton, J.M. (1977). "Beyond formal operations:" Theoretical thought in adolescence. Teachers College Record, 79(1), 87-98.

Broughton, J.M. (1978). Development of concepts of self, mind, reality, and knowledge. In W. Damon (Ed.), Social Cognition (New Directions for Child Development No. 1) (pp. 74-100). San Francisco: Jossey-Bass.

Broughton, J.M. (1981). The divided self in adolescence. Human Development, 21, 13-24.

Broughton, J.M. (1983). The cognitive-developmental theory of adolescent self and identity. In B. Lee and G.G. Noam (Eds.), Developmental approaches to the self (pp. 215-266). New York: Plenum.

Broughton, J.M. (1984). Not beyond formal operations but beyond Piaget. In M.L. Commons, F.A. Richards, & C. Armon (Eds.), Beyond formal operations: Late adolescent and adult cognitive development (pp. 395-411). New York: Praeger.

Cauble, M.A. (1976). Formal operations, ego identity, and principled morality: Are they related? Developmental Psychology, 12, 363-364.

Chandler, M.J. (1975). Relativism and the problem of epistemological loneliness. Human Development, 18, 171-180.

Chandler, M.J. (1976). Social cognition: a selective review of current research. In W.F. Overton & J.M. Gallagher (Eds.), Knowledge and development, Vol. 1 (pp. 93-147). New York: Plenum.

Chandler, M.J. (in press a). Doubt and developing theories of mind. In J. Astington, P. Harris, & D. Olson (Eds.), Developing theories of mind. Cambridge: Cambridge University Press.

Chandler, M.J. (in press b). The Othello effect: An essay on the emergence and eclipse of skeptical doubt. Human Development.

Chandler, M.J., & Boyes, M.C. (1982). Social-cognitive development. In B. Wolman (Ed.), Handbook of developmental psychology, (pp. 387-402). Englewood Cliffs, N.J.: Prentice-Hall.

Chandler, M.J., Boyes, M.C., Ball, L., & Hala, S. (October, 1985). Adolescence and the emergence of skeptical development. Paper presented at the annual meetings of the British Columbia Psychological Association, Parksville, Canada.

Clinchy, B., Lief, J., & Young, P. (1977). Epistemological and moral development in girls from a traditional and a progressive high school. Journal of Educational Psychology, 69, 337-343.

Cohen, J. (1960). A coefficient of agreement for nominal scales. Educational and Psychological Measurement, 20, 37-46.

Colby, A., Kohlberg, L., Gibbs, J., Candee, D., Speicher-Dubin, B., Kauffman, K., Hewer, A., & Power, C. (1987). The measurement of moral judgement: A manual and its results. New York: Cambridge University Press.

Coleman, J., Herzberg, J., & Morris, M. (1977). Identity in adolescence: Present and future self-concepts. Journal of Youth and Adolescence, 6, 63-75.

Commons, M.L., Richards, F.A, & Armon, C. (Eds.). (1984) Beyond formal operations: Late adolescent and adult cognitive development. New York: Praeger.

Craig-Bray, & Adams, G.R. (April, 1985). Different methodologies in the assessment of identity: Congruence between self-report and interview techniques. Paper presented in a symposium entitled Identity development from adolescence to adulthood, at the biennial meetings of the Society for Research in Child Development, Toronto.

Crook, J.H. (1980). The evolution of human consciousness. Oxford: Clarendon.

Dewey, J. (1915) The logic of judgement of practice. Journal of Philosophy, Psychology, and Scientific Method, 19, 505-523.

Donovan, James, M. (1975) Identity status and interpersonal style. Journal of Youth and Adolescence, 4, 37-55.

Douglas, J. (1971). Understanding everyday life. In J. Douglas (Ed.), Understanding everyday life (pp. 3-44). Chicago: Aldine Press.

Douvan, E., & Adelson, J. (1966). The adolescent experience. New York: Wiley.

Elder, Glen, H., Jr. (1980). Adolescence in historical perspective. In Joseph Adelson (Ed.), Handbook of adolescent psychology. New York: Wiley.

Elkind, D. (1967). Egocentrism in adolescence. Child Development, 38, 1025-1034.

Elkind, D. (1974). Children and adolescents: Interpretive essays on Jean Piaget (2nd ed.). New York: Oxford University Press.

Ennis, R.H. (1976). An alternative to Piaget's conceptualization of logical competence. Child Development, 47, 903-919.

Enright, R.D. & Lapsley, D.K. (1981). Judging others who hold opposite beliefs: The development of belief discrepency reasoning. Child Development, 52, 1053-1063.

Enright, R.D., Lapsley, D.K., Franklin, C.C., & Steuck, K. (1984). Longitudinal and cross-sectional validation of the belief discrepency reasoning construct. Developmental Psychology, 20, 143-149.

Erikson, E.H. (1959). Identity and the life cycles selected papers. Psychological Issues, 1, 1-171.

Erikson, E.H. (1968). Identity: Youth and crisis. New York: W.W. Norton & Co.

Feyerabend, P. (1975). Against method: An outline of an anarchistic theory of knowledge. London: NLB.

Flavell, J.H. (1963). The developmental psychology of Jean Piaget, Princeton, N.J.: Van Nostrand.

Flavell, J.H. (1982a). On cognitive development. Child Development, 53, 1-10.

Flavell, J.H. (1982b). Structures, stages, and sequences in cognitive development. In W.A. Collins (Ed.), Minnesota symposia on child psychology (Vol. 15) (pp. 1-28). Hillsdale, N.J.: Lawrence Erlbaum Associates.

Flavell, J.H. (1986). The development of childrens' knowledge about the appearance-reality distinction. American Psychologist, 41, 418-425.

Flavell, J.H. (in press). From level 1 to level 2 knowledge about the mind. In J. Astington, P. Harris, & D. Olson (Eds.), Developing theories of mind. Cambridge: Cambridge University Press.

Flavell, J.H., Green, F.L., & Flavell, E.R. (1986). Development of knowledge about the appearance-reality distinction. Monographs of the Society for Research in Child Development, 51(1, serial No. 212).

Gadamer, H.G. (1975). Truth and method. New York: Seabury Press.

Gilligan, C. (1982). In a different voice: Psychological theory and women's development. Cambridge, Mass.: Harvard University Press.

Gilligan, C., & Kohlberg, L. (1971). From adolescence to adulthood: The rediscovery of reality in a post-conventional world. In B.Z. Presseison, D. Goldstein, & M.H. Appel (Eds.), Topics in cognitive development. Vol. 2. Language and operational thought (pp. 125-136). New York: Plenum.

Gilligan, C., & Murphy, J.M. (1979). Development from adolescence to adulthood: The philosopher and the dilemma of the fact. New Directions For Child Development: Intellectual Development Beyond Childhood, 5, 85-99.

Gopnik, A. & Forguson, L. (1986, May). The roots of realism. Paper presented at the International Conference on Developing Theories of Mind, University of Toronto, Toronto.

Grotevant, H.D. & Adams, G.R. (1984). Development of an objective measure to assess ego identity in adolescence: Validation and replication. Journal of Youth and Adolescence, 13, 419- 438.

Grotevant, H.D., Thorbecke, W., & Meger, M.L. (1982). An extension of Marcia's identity status interview into the interpersonal domain. Journal of Youth and Adolescence, 11, 33-47.

Harvey, O.J., Hunt, D.E., & Schroder, H.M. (1961) Conceptual systems and personality organization. New York: Wiley.

Hollis, M. & Lukes, S. (1982). Rationality and relativism. Cambridge: MIT Press.

Hume, D. (1938). An abstract of a treatise of human nature. In J. Keynes & P. Sraffa (Eds.), Cambridge: Cambridge University Press.

Inhelder, B., & Piaget, J. (1958). The growth of logical thinking from childhood to adolescence. New York: Basic Books.

James, William (1956). The will to believe. New York: Dover.

Josselson, Ruthellen (1980). Ego development in adolescence. In J. Adelson (Ed.), Handbook of adolescent psychology (pp. 188-210). New York: John Wiley & Sons.

Keating, D.P. (1980). Thinking processes in adolescence. In J. Adelson (Ed.), Handbook of adolescent psychology (pp. 211-246). New York: Wiley.

Keniston, K. (1970). Youth: A new stage of life. American Scholar, 39, 631-654.

Kitchener, K.S., & King, P.M. (1981). Reflective Judgement: Concepts of justification and their relationship to age and education. Journal of Applied Developmental Psychology, 2, 89-116.

King, P.M., Kitchener, K.S., Davidson, M.L., Parker, C.A., & Wood, P.K. (1983). The justification of beliefs in young adults: A longitudinal study. Human Development, 26, 106-116.

Knefelkamp, L. & Slepitza, R. (1976). A cognitive developmental model of career development: An adaptation of the Perry scheme. The Counseling Psychologist, 6, 53-58.

Kohlberg, L. (1971). From is to ought. How to commit the naturalistic fallacy and get away with it in the study of moral development. In T. Mischel (Ed.), Cognitive development and epistemology. New York: Academic Press.

Kohlberg, L. (1973). Continuities in childhood and adult moral reasoning revisited. In P. Baltes & K.W. Schaie (Eds.), Life-span developmental psychology: Personality and socialization. New York: Academic Press.

Kohlberg, L. (1976). Moral stages and moralization. The cognitive developmental approach. In T. Lickona (Ed.), Moral development and behavior: Theory, research, and social issues (pp. 31-53). New York: Holt, Rinehart, & Winston.

Kohlberg, L., & Gilligan, C. (1971). The adolescent as philosopher: The discovery of self in a post-conventional world. Daedalus, 100, 1051-1086.

Kohlberg, L., Levine, C., & Hewer, A. (1983). Moral stages: A conventional formulation and a response to critics. Basel: Karger.

Krausz, J.W. & Meiland, M. (Eds.). (1982). Relativism: Cognitive and moral. Notre Dame: Notre Dame University Press.

Kuhn, D. (Ed.). (1979). Intellectual development beyond childhood. New Directions for Child Development: Intellectual Development Beyond Childhood, Whole Vol. 5.

Kuhn, D., & Brannock, J. (1977). Development of the isolation of variables scheme in experimental and "natural experimental" contexts. Developmental Psychology, 13, 9-14.

Kuhn, D., & Ho, V. (1977). The development of schemes for recognizing additive and alternative effects in the "natural experiment" context. Developmental Psychology, 13, 515-516.

Kuhn, D., Pennington, N. & Leadbeater, B. (1983) Adult thinking in developmental perspective: The sample case of juror reasoning. In P. Baltes & O. Brim (Eds.), Life-span development and behavior, Vol. 5 (pp. 157-195). New York: Academic Press.

Kuhn, T.S. (1970). The structure of scientific revolutions. (2nd ed.). Chicago: University of Chicago Press.

Kundera, M. (1984). The unbearable lightness of being. New York: Harper & Row.

Kurfiss, Joanne (1977). Sequentiality and structure in a cognitive model of college student development. Developmental Psychology, 13, 565-571.

Labouvie-Vief, G. (1980). Beyond formal operations: Uses and limits of pure logic in life-span development. Human Development, 23, 141-161.

Langdale, C.J. (1983). Moral orientations and moral development: The analysis of care and justice reasoning across different dilemmas in females and males from childhood through adulthood. Dissertation Abstracts International, 44, 1998 B. (University microfilms no. 83-20, 175).

Leadbeater, B.J., & Dionne, J.P. (1981). The adolescent's use of formal operational thinking in solving problems related to identity resolution. Adolescence, 16, 111-121.

Leiper, R.N. (1981) The relationship of cognitive developmental structures to the formation of ego identity in young men. Unpublished doctoral dissertation, Simon Fraser University, Burnaby, Canada.

Livesly, W.J. & Bromely, D.B. (1973). Person perception in childhood and adolescence. London: Wiley.

Lyons, N.P. (1983). Two perspectives: On self, relationships and morality. Harvard Educational Review, 53(2), 125-145.

Mansfield, A. & Clinchy, B. (1985, April) A developmental study of natural epistemology. Paper presented at the biennial meeting of the Society for Research in Child Development, Toronto.

Marcia, J.E. (1966). Development and validation of ego identity status. Journal of Personality and Social Psychology, 5, 551-558.

Marcia, J.E. (1976). Identity six years after: A follow-up study. Journal of Youth and Adolescence, 5, 145-150.

Marcia, J.E. (1980). Identity in adolescence. In J. Adelson (Ed.), Handbook of adolescent psychology (pp. 159-187). New York: Wiley.

MacIntyre, A. (1984). After virtue (2nd ed.). Notre Dame: Notre Dame University Press.

Matteson, D.R. (1972). Exploration and commitment: Sex differences and methodological problems in the use of identity status. Journal of Youth and Adolescence, 6, 353-375.

Munro, G., & Adams, G.R. (1977). Ego-identity formation in college students and working youth. Developmental Psychology, 13, 523-524.

Neimark, E. D. (1975). Intellectual development during adolescence. In B. Horowitz (Ed.), Review of child development research, Vol. 4, (pp. 541-594). Chicago: University of Chicago Press.

Neimark, E. D. (1979). Current status of formal operations research. Human Neimark, E. D. (1979). Current status of formal operations research. Human Development, 22, 60-67.

Neitzsche, F. (1956). The birth of tragedy and the geneology of morals. (Originally published in 1872). New York: Doubleday.

Newman, B.M., & Newman, P.R. (1978). The concept of identity: Research and theory. Adolescence, 13(49), 157-166.

Noam, G.G., Kohlberg, L., and Snarey, J. (1983). Steps towards a model of the self. In B. Lee & G.G. Noam (Eds.), Developmental approaches to the self (pp. 59-141). New York: Plenum.

Nucci, L. (1981). Conceptions of personal issues: A domain distinct from moral and societal concepts. Child Development, 52, 114-121.

Olson, D. (in press) The nature and origins of mental representation. In J. Astington, P. Harris, & D. Olson (Eds.), Developing theories of mind. Cambridge: Cambridge University Press.

Orlofsky, J., Marcia, J., and Lesser, J.E. (973). Ego identity status and the intimacy versus isolation crisis of young adulthood. Journal of Personality and Social Psychology, 27, 211-219.

Penelhum, T. (1967). Personal identity. In J. Edwards (Ed.), Encyclopedia of philosophy Vol. 6 (pp. 95-107). New York: Macmillan.

Perner, J. (in press) Higher-order beliefs and intentions in children's understanding of social interaction. In J. Astington, P. Harris, & D. Olson (Eds.), Developing theories of mind. Cambridge: Cambridge University Press.

Perry, William, G., Jr. (1970). Forms of intellectual and ethical development in the college years. New York: Academic.

Piaget, J. (1929). The child's conception of the world. London: Routledge and Kegan Paul.

Piaget, J. (1960). The general problems of the psychobiological development of the child. In T. Tanner & B. Inhelder (Eds.), Discussions on child development: The proceedings of the World Health Organization study group on the psychobiological development of the child: 4 (pp. 3-27). New York: International Universities Press.

Piaget, J. (1970). Piaget's theory. In P.H. Mussen (Ed.), Carmichael's manual of child psychology. Vol. 1 (3rd Edition) (pp. 703-732). New York: Wiley.

Podd, M.H. (1972), Ego identity status and morality: The relationship between two developmental constructs. Developmental Psychology, 6, 497-507.

Poirier-Heine, D. (1987). Unpublished masters thesis, York University, Downsview.

Popper, K.R. (1972). Objective knowledge. Oxford: Clarendon Press.

Raphael, D., & Xelowski, H.G. (1980). Identity status in high school students: Critique and a revised paradigm. Journal of Youth and Adolescence, 9, 383-389.

Reigel, K.F. (1973). Dialectic operations: The final period of cognitive development. Human Development, 16, 346-370.

Rest, J.R. (1983). Morality. In J.H. Flavell, & E.M. Markman (Eds.), Handbook of child psychology: Vol. 3, Cognitive Development. (4th Edition, pp. 556-629). New York: Wiley.

Rokeach, M. (1960). The open and closed mind: Investigations into the nature of belief systems and personality systems. New York: Basic Books.

Rowe, I. & Marcia, J.E. (1980). Ego identity status, formal operations, and moral development. Journal of Youth and Adolescence, 9, 87-99.

Schmidt, J.A., & Davison, M. (1981). Does college matter? Relective judgement: How students tackle the tough question. Moral Education Forum, 10, 2-14.

Selman, R.L. (1980). The growth of interpersonal understanding: Developmental and clinical analyses. New York: Academic Press.

Shantz, C.V. (1975). The development of social cognition. In E.M. Heatherington (Ed.), Review of child development research. (Vol. 5, pp. 257-323). Chicago: University of Chicago Press.

Shantz, C.V. (1983). Social cognition. In J.H. Flavell and E.M. Markman (Eds.), Handbook of child psychology: Vol. 3, Cognitive Development (pp. 495-555). New York: Wiley.

Sheese, R. & Radovanovic, H. (1984, June) W.G. Perry's model of intellectual and ethical development: Implications of recent research for the education and counselling of young adults. Paper presented at the annual meeting of the Canadian Psychological Association, Ottawa.

Shotter, J. (1984). Social accountability and selfhood. Oxford: Basil Blackwell.

Sills, J., & Herron, J.D. (1976). Study of an electronic analog to the combination of chemical bodies Piagetian task. Journal of Genetic Psychology, 129, 267-272.

Sinnott, J.D. (1984). Postformal reasoning: The relativistic stage. In M.L. Commons, F.A Richards, & C. Armon (Eds.), Beyond formal operations: Late adolescent and adult cognitive development (pp. 298-325). New York: Praeger.

Slugoski, Ben, R. (July, 1984). Ego identity and explanatory speech. Paper presented at the meetings of the International Conference on Self and Identity in Cardiff, Wales.

Slugoski, Ben, R., Marcia, J.E., & Koopman, R.F. (1984). Cognitive and social interactional characteristics of ego identity statuses in college males. Journal of Personality and Social Psychology, 47, 646-661.

Smetana, J.G. (April, 1985). Family rules, conventions, and adolescent-parent conflict. Paper presented at the biennial meetings of the Society for Research in Child Development, Toronto.

Stephenson, B.W., & Hunt, C. (1977). Intellectual and ethical development: a dualistic currculum intervention for college students. The Counseling Psychologist, 6, 39-42.

Strange C.C. & King, P.M. (1981). Intellectual development and its relationship to maturation during the college years. Journal of Applied Developmental Psychology, 2, 281-295.

Swoyer, C. (1982). True for. In M. Krausz & J.W. Meiland (Eds.), Relativism: Cognitive and Moral (pp. 84-108). Notre Dame: University of Notre Dame Press.

Taylor, M. (1985). The development of children's ability to distinguish what they know from what they see. Unpublished doctoral dissertation, Stanford University, Stanford.

Taylor, M. & Flavell, J.H. (1984). Seeing and believing: Children's understanding of the distinction between appearance and reality. Child Development, 55, 1710-1720.

Touchton, J., Wertheimer, L., Cornfeld, J., & Harrison, K. (1977). Career planning and decision making: A developmental approach to the classroom. The Counseling Psychologist, 6, 42-47.

Turiel, E. (1983). The development of social knowledge. New York: Cambridge University Press.

Turiel, E., & Smetana, J.G. (1984). Social knowledge and action: The coordination of domains. In W.M. Kurtiness, & J.L. Gewitz (Eds.), Morality, moral behavior and moral development (pp. 261-282). New York: Wiley.

Wagner, J. (1976). A study of the relationship between formal operations and ego identity in adolescence. Unpublished Doctoral Dissertation. State University of New York at Buffalo, New York.

Walker, L.J. (1980). Cognitive and perspective taking prerequisites for moral deliberation. Child Development, 51, 131-139.

Walker, L.J., de Vries, B., & Bichard, S.L. (1984). The hierarchical nature of stages of moral development. Developmental Psychology, 20, 960-966.

Walker, L.W., & de Vries, Brian (June, 1985). Familial patterns of moral reasoning. Paper presented at the annual meetings of the Canadian Psychological Association in Halifax, Nova Scotia.

Walker, L.J., de Vries, B., & Trevethan, S.D. (1987). Moral states and moral orientations in real life and hypothetical dilemmas. Child Development, 58, 842-858.

Waterman, Alan, S. (1982). Identity developoment from adolescence to adulthood: An extension of theory and a review of research. Developmental Psychology, 18, 341-358.

Waterman, Alan, S., & Waterman, C.K. (1971). A longitudinal study of changes in ego identity status during the freshman year at college. Developmental Psychology, 5, 167-173.

Waterman, A.S., Geary, D.S., & Waterman, C.K. (1974) Longitudinal study of changes in ego identity statuses from freshman to senior year at college. Developmental Psychology. 10, 387 - 392.

Weigert, A.J. (1983). Identity: Its emergence within sociological psychology. Symbolic Interaction, 6, 183-206.

Welfel, E. (1982). The development of reflective judgement: Implications for career councelling of collegs students. The Personnel and Guidance Journal, 61, 17-21.

Welfel, E. & Davison, M.L. (1986). The development of reflective judgement during the college years: A fout year longitudinal study. Journal of College Student Personell, 27, 209-216.

Wellman, H.M. (1985). The child's theory of mind: The development of conceptions of cognition. In S.R. Yussen (Ed.), The growth of reflection in children (pp. 169-206). New York: Academic Press.

Wellman, H.M. (in press). First steps in the child's theorizing about the mind. In J. Astington, P. Harris, & D. Olson (Eds.), Developing theories of mind. Cambridge: Cambridge University Press.

Widick, C. (1977). The Perry scheme: A foundation for developmental practice. The Counselling Psychologist, 6, 35-38.

Widick, C., Knefelkamp, L., & Parker, C.A. (1975). The counselor as developmental instructor. Counselor Education and Supervision. 14, 286-296.

Wimmer, H. & Perner, J. (1983). Beiefs about beliefs: Representation and constraining function of wrong beliefs in young children's understanding of deception. Cognition, 13, 103-128.

Wimmer, H. & Hogrefe, J. (in press). A second stage in children's conception of mental life: Understanding sourses of information. In J. Astington, P. Harris, & D. Olson (Eds.), Developing theories of mind. Cambridge: Cambridge University Press.

APPENDIX A

Models of Epistemic Development

Piaget's Levels of Realism

1. Absolute Realism. No distinction is made between thoughts or
   representations and the objects they represent. Objects alone
   exist.

2. Immediate Realism. Representations are recognized as the
   instruments of thought but are understood to be located in the
   object of knowledge and not in the knower.

3. Mediate Realism. Representations, or the instuments of thought,
   are distinguished from the objects for which they stand. This
   is accomplished, however, by granting them an independent
   existence. They are understood to exist within one's body or in
   the surrounding air.

4. Subjectivism or Relativism. Self-Other differentiation is
   complete. Representations, as the instruments of thought, are
   understood to be located within the knower. Knowledge of
   objects is thus understood to be a constructive process.

<u>Baldwin's Stages of Self and Knowledge</u> (Broughton, 1975)

1. <u>Projective</u>. There is no differentiation between self and objects of knowledge -- no self as agent. Reality is either seen or not seen, in copy-theoretic fashion. Persons are understood simply as objects to be distinguished from other physical objects.

2. <u>Subjective</u> (The Inner/Outer Dualism). A distinction is drawn between internal opinions and desires and external instruments or objects of inner goals. Agency may be conceived of, but egocentrically.

3. <u>Ejective</u>. The inner subjective experience of the previous level is now ascribed to, or projected into, others. Interest drives perception but is socially directed. Subjectivity is, therefore, social and not yet individual.

4. <u>Objective</u>. The subjective is not diminished at this level but is, rather, caught up and surpassed by concern with objective and accurate knowledge-for-itself. Personal understanding and interest derive from one's collected body of facts and truths. Personal objectivity is possible.

5. <u>Immature Dualism</u>. The dualistic contradiction of the body as physical object under one's control and simultaneously as the location of one's subjective perspective is realized. At this initial level this problem is resolved either by denying or overcomming the physical or by denying concern over the duality itself.

6. <u>Psycho-Physical Dualism</u>. As the opposing poles of this subjective/objective dualism gain strength, the existence neither of mind or body can no longer be suppressed or ignored. The poles are thus materially separated -- the objective consigned to the physical world and the subjective consigned to the spiritual world. These opposing worlds are understood to come together in the self which is simultaneously an object in the physical world and in possession of a soul which is the manifestation of the subjective/spiritual world.

7. <u>Reflective Dualism</u>. At this level, the self is understood as the subjective center of its experience. Knowledge exists in the form of the representations or internal objects of knowedge. The subject must therefore judge the meaning and value of his or her ideas through reflection. A skeptical or critical attitude emerges and the understanding of knowledge as the constructivistic result of reason and argument is established.

8. <u>Logical</u>. The constructivistic view of the knowing process, introduced at the previous level is consolidated and systematized at this level. Knowledge is understood to be the result of a rational enterprise and as such may be shared, and hopeless subjectivity avoided, by the use of rational judgement.

Perry's Model of Intellectual and Ethical Development

1. Basic Duality. Truth and certainty are available to all, either directly through one's own experience or through adherence to the dictates of authority. The world is absolutistically divided into self/own group-right and other-wrong.

2. Multiplicity Pre-Legitimate. Diversity of views or opinion are vaguely recognized but are denied or blamed on confusion or purposeful artifice on the others' part. At this level, diversity of opinion has no epistemic import.

3. Multiplicity Subordinate. Diversity of views and opinion is granted some legitimacy at this level. Uncertainty or diversity of opinion is the temporary result of incomplete knowledge. Authorities' knowledge may also be incomplete. People at this level may differ in how they view what one may do while waiting for certain knowledge. Some view the knowledge process as an interesting exercise to be evaluated in terms of style until knowledge is eventually revealed while others are concerned that in the absense of certain knowledge they may be subject to the caprice of authority.

4. Multiplicity Correlate or Relativism Subordinate. At this level knowledge is more clearly divided into those areas where certainty is possible and those where it is not. In cases where absolutes are doubted or considered so remote as to be inaccessible, anyone's opinion is as valid as any others'.

5. Relativism. Subjectivity is no longer seen as a transient problem or as a mode of thought demanded by authority, but is viewed instead as an intrinsic part of the knowing process. The world may still be divided into those areas where authority has the answers (e.g., physics or chemistry) and those areas where relativism is intrinsically interwoven through the knowing enterprise or it may be accepted as applying to the entire knowing process. As yet no clear method for proceeding in those areas characterized by relativism is thought to be available.

6. Commitment Foreseen. Relativism is accepted as an inexorable part of the knowing process. Commitment is recognized as the only way that one may proceed in such a world. At this level commitments are not yet made. What may be noted, rather, is any of a series of reactions to this initial realization (e.g., turmoil, eagerness, dismay, or simple acceptance to name but a few).

7. Initial Commitment. First commitments are made and their grounding in one's own personal reasoning and choices is acknowledged. There is, as yet, little consideration of the implications of such commitments.

8. <u>Orientation in Implications of Commitment</u>. The implications of commitmant are realized and considered. These include opposing concerns over tentativeness and finality, action and reflection, and freedom and constraint. One begins, at this level, to gather a sense of identity both in terms of the specific commitments made or contemplated and in the manner in which commitment is expressed.

9. <u>Developing Commitments</u>. Commitments and their implications are jointly considered as one's life and commitments, past, present, and future are contemplated. Continuity of identity is acknowledged despite changes in mood or outlook and one shifts from reflecting upon one's life to living within it.

Broughton's Epistemological Levels

0. <u>Undifferentiated</u>. No distinction is made between knowledge and known. Knowledge is the direct result of experience with reality.

1. <u>Objective</u>. Thoughts include representations of a visible/tangible reality and are themselves semi-real though invisibly located in the mind.

2. <u>Naive Subjective</u>. Reality exists and is presented to the self as facts through sense-data. Knowledge, however, is comprised of subjective/unshared opinions regarding such public facts.

3. <u>Spirituality</u>. Reality is understood at this level to be exist as an ideal or essence behind surface appearance. Truth is verified and certainty redeemed not with reference to sense-data as at previous levels but through social verification or common sense.

4. <u>Positivist</u>. There is no direct access to truth at this level but certainty may be vouchsafed by the hypothetical deductive scientific modelling of reality which is lawful but beyond direct access. Scientific objectivity is understood to redeem skeptical subjectivity.

$4^{1/2}$. <u>Solipsist</u>. At this level all knowledge, being derived from personal experience is necessarily person-relative. All knowledge is unavoidably subjective and reality is appearance.

5. <u>Subjective Idealist</u>. Knowledge is understood to be the result of the application of rational criteria. Various, equally valid, systems of subjectively defined criteria may exist by which to define rationality. Knowledge is constructed and truth is therefore relative to perspective.

6. <u>Objective Idealist</u>. An idealized perspective. Reality and truth dervive from judgement based upon criteria which may be universalized.

Kuhn, Pennington, and Leadbeater's
Levels of Cognitive Relativism

0. Nonreflective[*]. Accounts of events are not distinguished from the events they depict. This absense of any appreciation of the possibility of commenting upon events results in an unquestioned realism. Knowledge simply is.

1. Copy Theoretic[*]. Accounts are tacitly acknowledged to be distinct from the events they represent but, because the events themselves are understood to be directly available to experience, any discrepencies between accounts of such events are dismissed as due to incomplete reporting of the facts.

2. Realist. At this level, reality is still understood to be the final arbiter of differing accounts of events in the world. Divergent accounts are believed at this level to be ascribable to different renderings of the facts or to inclusion of different subsets of facts. Thus while accounts may differ there is still a single reality against which they may be checked for relative veracity.

3. Perspectivist. At this level the discourse is divided into two contrasting domains -- the realm of objective fact and the realm of subjective opinion. Differing accounts of a single event may be the result of differences at the level of opinion but such differences may be reconciled by referencing the underlying facts of the matter. At this level opinions are understood to be subordinate to facts.

4. Relativist. At this level the hierarchical ordering of the two realms of discourse mapped out at the previous level is reversed. Facts are understood to have meaning only when filtered through a subjective frame or perspective. Differing accounts may thus no longer be reconciled by refering to an objective reading of the available facts. Truth, at this level, is relative to subjective perspective.

* These levels were unlabeled in the original authors' account.

Kitchener and King: The Reflective Judgement Model

Stage 1. Reality is objectively given and knowledge of it is
perceptually derived directly from experience. Diversity of
opinion is not possible within this view and is therefore not
noticed.

Stage 2. Reality at this level exists to be known but may not be
immediately available to all. When absolute knowledge eludes
the individual it may be redeemed through consultation with
legitimate authorities to whom the knowledge is available.

Stage 3. Objective knowledge of reality is possible at this level
though it may, in some instances, be temporarily unavailable
and await future discovery by authorities who are applying
themselves to the problem.

Stage 4. Objective reality exists but is beyond the grasp even of
the authorities. For practical reasons, objective knowledge is
impossible to obtain, absolute certainty is irredeemably lost,
and knowledege is consequently person-relative.

Stage 5. Objective knowledge does not exist and is therefore
unattainable. All knowledge is thus a subjective interpretation
of personal experience evaluated or justified on the basis of
context or perspective relative criteria.

Stage 6. Similar to Stage 5, except that at this level truth or
knowledge criteria are rationally grounded in generalized rules
of evidence and inquiry which are abstracted from and span
differing perspectives.

Stage 7. At this level, it is held that, through a process of
reasonable inquiry based upon rational criticism, knowledge
statements may be evaluated as more or less likely
approximations to reality.

APPENDIX B

Measures of Formal Operations:

Protocols and Scoring Criteria

PROBABILITY (BEADS) PROBLEM: SCORING CRITERIA

LEVEL 0 Unable to give any systematic account of the probability involved.

LEVEL 1 Able to express and explain the rudiments of systematic probability as evidenced by predicting one in three, 1/3, or 33.3% probability of getting a particular color on the first draw. Is limited, however, as it may only be based on an intuitive appreciation that the odds are equal when there are and equal number of beads of each color. They may also appreciate, by this reasoning, that the odds of repeating the first draw on the second draw are lower, but they are not as yet capable of quantifying those odds.

LEVEL 2 Full quantification of probability on the first and on subsequent draws (e.g., 5/17 on second draw). Able to explain answer though obviously if someone can compute the correct answer of 5/17 they can explain it. If word of the task has been passed around from screened to unscreened subjects someone might give this answer and be unable to explain it. Simply saying that the odds would be less than 1 in 3 is not sufficient to warrant a level 2 score.

BLACK BOX PROBLEM: SCORING CRITERIA

LEVEL 0 Totally random responding both spontaneuosly and when asked either why they proceeded the way they did or if there was some more systematic or orderly way they could have proceeded.

LEVEL 1 We can assume the existence of the ability to push the buttons one at a time. At this level are found the beginnings of a variety of possible semi-systems for trying button combinations. Proficiency with pairs of buttons precedes that with sets of three buttons so this scoring level focusses on pairwise attempts. Either by action or by explanation, semi-systems include all those systems which fail by falling short of demonstrating all possible pairwise combinations and leaving the subject unsure as to whether they have tried all possible pairs. Such semi-systems have a perceptual quality about them. They represent ordered ways of pushing buttons two at a time that are consciously (strategically or thoughtfully) chosen, and may be described, but lack any reflection upon the the system as a whole and its relation to the task of finding all logically possible combinations of a perticular set of buttons. An example of such semi-systems is the Drift approach in which a certain placement or spacing of the fingers is tried at one end of the row of buttons and moved or drifted across the row (e.g., 12, 23, 34, 45 or 13, 24, 35). A Symetric semi-system is one in which the buttons are pressed in ways which balance both the length of the button spread (i.e., adjacent buttons, alternate buttons, etc. e.g., 12, 45 or 13, 35, 24, etc.).

LEVEL 2 Systematic performance, either in action or by verbal report, through the pairs (i.e., 12, 13, 14, 15, 23, etc.) but use of no system or of semi-systems on the sets of three buttons using stratagies like those outlined in level 1.

LEVEL 3 Systematic through the pairs and through the sets of three but poor performance on the sets of four. Central to this level is the ability to continue the system either verbally or by demonstration beyond making the light go on.

LEVEL 4 Systematic, either in word or deed, through all possible combinations, including most or all fours. May or may not comment directly on the specific effects of the unwired and reverse wired buttons.

Scoring Notes

(1) If the subject performs at a lower level when trying combinations wordlessly but when questioned as to the possibility of using a system clearly describes a systematic approach, score their words and not their deeds.

(2) Successfully generating all possible sets of four buttons by working backwards from five is a clever but simple strategy similar to pushing one button at a time. It is commendable but the approaches used to generate the sets of two and three should be scored.

(3) If there is insufficiant information to fully appraise a subject's performance on this task, give them a G (for guess) and, where possible, assign a scoring level as well (e.g., G2 or G3 etc.). This will allow us to take such a score or the lack of a score with the appropriate amount of salt.

PLANTS PROBLEM: SCORING CRITERIA

LEVEL 0 Reasons solely on the basis of isolated instances. That is, sees no connection between the plants as they appear in the pictures and the information they represent as to the logical manipulation of the variables in the experiment the pictures are intended to depict. E.G., Use A, B, or C because that plant looks pretty good or looks the best. At this level they fail to exclude the inoperative variable. E.G., A has something to do with it. It seems to help but only a little bit.

LEVEL 1 (a) Recommends a specific food or foods because they appear in the picture to have turned out well but fail to spontaneously speak to all aspects of the operative variable(s) e.g.,such as their interactive effects with other variables or the lack thereof. Excludes A as no good either simply with reference to "how it turned out" or because it is "the same as no food" but fails to generalize this exclusion to the various combinations which include A (I.E., AB, AC, ABC).

LEVEL 1 (b) As in Level 1 but does extend exclusion of A to include those combinations of which.A is a part.

LEVEL 2 (a) Properly identifies either the additive or the alternative effects but not both, excludes A both singly and in combinations either spontaneously or when asked directly, and either does or does not appreciate that there is some kind of difference in how the plant foods effect each type of food (though the noted differences may be more descriptive than empirical).

LEVEL 2 (b) Properly identifies both the alternative and the additive effects, excludes A as in Level 2 (b), but fails to note the different effects of the foods on the two types of plants.

LEVEL 3 Correctly identifies both the additive and the alternative effects, logically excludes the inoperative variable A in all its manifestations (though perhaps only when asked), and clearly identifies the differential effects of the foods on the two kinds of plants by referring to the singular versus interactive (additive or multiplicative) effects of the plant foods themselves rather than simply describing how the plants look.

APPENDIX C

Epistemic Doubt Interview:

Stories, Probes, and Scoring Manual

DRIVING AGE

In a small town in British Columbia a meeting had been called about whether the local high school should continue to offer a driver's education course. Many parents were against the school offering this course and many students wanted the course to continue. A committee of parents and a students' committee both wrote articles which appeared in the local paper before the meeting took place. Parts of these articles are shown below:

Report by
The Parent's Committee for Safe Driving

We are opposed to the high school offering a driver training course for its students. Scientific information presented in this paper over the past few weeks clearly shows that 16 year olds, as a group, are not responsible enough to be trusted with the handling of a motor vehicle. While the law now permits 16 year olds to obtain a driver's license, with parental permission, teenagers should not be allowed to drive until they are at least 19 years old. Offering a driver training course through the school puts unfair pressure on parents to let their children learn to drive before they are 19 years old. The course must be taken out of the school imediately for the safety of all concerned.

Report by
The Student Committee for Young Drivers

We are in favour of continuing the driver training course in our high school. The scientific information that has been printed in this newspaper and elsewhere support the view that 16 year olds are just as responsible as adults and should be able to learn to drive as soon as they are legally allowed to do so. The driver training course in the high school encourages students to follow a proper training program and become better drivers. The law allows us to drive at 16 years of age and we should have a training course in our school for everyone to take.

I.   1. On the basis of what you've read tell me what the parents' and
         students' committees said about the issue of 16 year olds being
         responsible enough to drive.

      2. Are the arguments and conclusions of the two committees (as they
         are presented here) different in any important ways? How are
         they different?

II.   1. How could these two committees end up having such different
         things to say about the issue of 16 year olds being responsible
         enough to drive?

      2. Why do you think these two committees wrote such different
         articles?

      3. Do you think one of the committees has got the facts wrong? How
         important is that to the disagreement? (Would that be
         important?)

III. 1. If these two groups had all of the same information might they
         still disagree? Explain why that is or is not possible.)L

      2. It sounds as though you're saying people can view things in any
         way they want, is that what you are saying?

      3. What if another group reviewed the same information and decided
         that kids should be allowed to drive when they were twelve
         years old, would that be an O.K. opinion to have? Why or why
         not?

      4. What if a group of specialists reviewed the positions of the
         parent and student committees. Do you think that the
         specialists might know what was best to do? What makes you say
         that?

IV.   1. Is there a way of deciding which of these reports the principal
         should pay most attention to in deciding the fate of the driver
         training course? Why or why not?

      2. What kinds of things might the principal consider in order to
         determine what to do about the driver education course?

NATIVE LIFESTYLES

Recently sociologists who have spoken to West Coast Indians and studied their society published two new books about the West Coast Indians and their relation to our non-native society. What follows are paragraphs from the first page of each of these new books.

Cultural Independence and the Coastal Indians

We have interviewed, lived with, and studied the West Coast Indians and their culture and have found that they led happier, richer, more meaningful lives when they lived on their own in tribal groups than they did after they had contact with Europeans and others who settled North America. Even though modern influences have improved a few things overall, however, contact with non-native people since pioneer times has brought the Coastal Indians many problems. These problems are so serious that the best thing that could happen would be for native people to become more independent of non-native groups.

West Coast Indians: A Case for Cultural Integration

Based on a large research project in which we lived with and interviewed West Coast Indians and studied their culture we found that their life style today is happier and more prosperous than it ever was. Modern knowledge in such areas as health care and education and modern technology in the fishing industry and other areas has greatly increased the standard of living, financial security, and happiness of the West coast Indians. Even though a few problems have been created in the course of the many changes that have taken place as a result of contact with the non-native society, overall the benefits far outweigh these temporary adjustment issues. The best thing that could happen would be for native people to increase their contact with the non-native population.

I. 1. On the basis of what you have read, tell me what these two
       groups of authors have written about West Coast Indians and
       their relation to our non-native society.

    2. Are the arguements and conclusions in these two books different
       in any important ways? How are they different?

II. 1. Why do you think the authors of these two book reached such
       different conclusions in their books?

    2. On the basis of what you have read, do you think that one of
       these books is mistaken about what has happened in the lives of
       the West Coast Indians? How important are such mistakes in
       accounting for the different conclusions of these books? (Would
       they be important?)

III. 1. Since these two groups of sociologists interviewed, lived with,
        and studied the same Indian group, how could they end up having
        such different things to say about West Coast Indians and their
        relation to our non-native society?

     2. It sounds as though you are saying that people can view things
        in any way they want, is that what you mean?

     3. What another group of sociologists looked at these same facts
        and wrote a book which said that the children of native parents
        should be removed from their homes at birth and raised in non-
        native households. Would that be an O.K. opinion to have? Why
        or why not?

     4. What if a group of West Coast Indians read both of these books,
        would they be able to tell whether more or less contact with
        non-natives would be best for native people? What makes you say
        that?

IV. 1. Is there a way of deciding which of these books government
       officials ought to pay most attention to in deciding what would
       be best for The West Coast Indians? Explain further or why not?

    2. What other kinds of things might government officials, consider
       in order to get a clear picture of whether West Coast Indians
       would be better off with more or less non-native contact?

General Probes

What is it about these situations that makes finding out or deciding
what is best or right so hard?

Is that true just for these situations or is it generally true? That is,
are these just weird situations or are there a lot of situations
like these in life and the world?

How should we approach these sorts of situations, what should we do?

How should we decide what to believe and what to do?

We could just decide to go our own ways when we disagree but as in these
situations we often cannot do that. What then shall we do?

How do we decide what to think in these sorts of situations?

The Epistemic Doubt Interview

The Epistemic Doubt Interview was constructed in order to provide subjects with a series of controlled opportunities to make explicit their epistemic assumptions regarding the nature and attainability of knowledge and truth. Based on the reasoning that subjects' assumptions regarding the nature of knowledge would be thrown into boldest relief when they were considering instances of contradictory or competing knowledge claims, the two stories featured in the interview were written so as to portray different individuals as advancing divergent knowledge claims about about the same issue or event. A series of standard probes followed each story.

These standard probes were intended as a means of making as explicit as possible how it is that the subject both constructed and undertook to resolve the competing knowledge claims set out in each story problem. In each case the probes were intended to encourage subjects to press the limits of their understanding of the problem posed and to elaborate their beliefs as to the form and appropriateness of, possible solution strategies. In the problem construction section of the interview subjects were first asked to what extent the disagreement portrayed in the story was to a lack of appropriate access to the facts on the part of one or the other group of protagonists. To the extent that the response to this probe laid full responsibility for such disagreements, the remainder of the probes in this section simply served to confirm, the extent to which the subject's belief that differential access to the facts was the single cause of disagreement. If, however, responsibility for the contrasting claims made by the story characters was not layed entirely at the door of different access, and to the

extent that the subject was not spontaneously forthcoming with what else might be involved, all subsequent probes were intended to encourage them to expand upon just what else they might believe was involved. These probes amounted to requests for the subject to be more explicit about the nature of those other factors which he or she believed might also be responsible for such disagreements and the manner in which the facts relate to the knowing process.

Once subjects had indicated by their responses what they took to be the basis for the competing knowledge claims, the second section of the interview accepted that construction of the problem and went on to ask subjects what they saw as a viable means of dealing with the problems as defined. In order to facilitate this, the first probe in this section asked whether a third party, in the form of a specialist or expert could be of any assitance in resolving the problem. The optional follow-up probes to this general question were intended to allow subjects to elaborate upon the role which experts or other third parties might play whenever experts were portrayed as being of limited use. The remaining probes enquired whether there were some other ways by means of which individuals might decide which of two competing claims might have the greater merit and should be used as a guide for subsequent action.

The final set of general probes, which followed the second story was intended to provide additional opportunities for subjects to both reframe the problems presented and to describe what they believed to be generally viable solution strategies in situations of this sort. By pressing for generalities common to both stories this last set of probes was intended to encourage general statements regarding the relevance of competing knowledge claims for the whole epistemic enterprise.

Scoring Units

A scorable unit was defined as a complete thought on the part of a subject and contained all responses relevant to a particular issue or concern. Thus such scoring units contained most of what a subject said spontaneously or in response to specific probes concerning their construction or resolution of the problem presented. Scoring units did not include statements of personal preference, opinion, or other irrelevent detail when they were offered simply as asides. Such statements were considered, however, if they were clearly taken by the subject as grounds for understanding the problem of competing knowledge claims or for deciding which claim has more merit.

As Selman (1980) has noted, when a construct of interest is developmental and involves an investigation of age related changes, the tasks of interviewing subjects and scoring their responses are equally important and closely related parts of the same enterprise. The interviewer must keep in mind all that the scorer knows about the developmental response variation anticipated in order to effectively probe subjects' statements and obtain scorable responses. For related reasons, the scoring strategy for assigning subjects' reactions to the story problems to particular levels within the current model of epistemic development clearly paralleled the interview format by separately coding the manner in which each subject constructed and elaborated the problem posed in each story and the stand of each subject regarding what constituted an appropriate solution strategy. In both instances scoring proceeded in a stepwise fashion beginning with the level of epistemic naive realism and proceeding upwards through the levels on the basis of criteria to be detailed below.

Construction of the Problem

The scoring criteria presented below were applied to responses to the probes regarding the status of the facts in the competing claims advanced in each story. As such, they are intended to facilitate classification of subjects' construction of the problem of competing knowledge claims into one of the four levels in the developmental model.

Level 0: Realism, Different Facts = Different Claims. If subjects responded to the initial questions about what is going on in the stories, or to the specific queries about whether one of the parties in the story had the facts wrong, by stating that differential access to the facts caused the divergence of claims, then, unless subsequent evidence was found to the contrary, they were scored as level 0 epistemic realists. As outlined earlier, epistemic realists believe that truth in the form of "the facts" is available to all. At this level all thoughts, beliefs, and opinions are seen to be the result of direct contact with material reality. By these lights, people who disagree are seen to do so because they have experienced different parts of the same reality, have talked to different people, or have been at different places or at the same place at different times. Also at this level no categoric distinction is made between facts and opinions, although the term opinion may be used to refer to the views of those persons who have had only partial access to the facts or intended as a synonym for partial knowledge or ignorance.

A prominent feature of the thinking of subjects scored at level 0 is a commitment to a view that knowledge claims are entirely determined by direct experience with the world and because of this, competing knowledge claims are automatically understood by them to imply some

differential access to the facts. Positive responses to the first probe, regarding whether one of the parties has the facts wrong, when accompanied by negative responses to the followup probes about what else might be involved, were scored at level 0. Specific statements scored at this level included all responces to story number 1 that expressed the view that the parents and students must have read different newspapers or different studies, or responces to story number 2 that indicated that the sociologists must have spoken to different individual Indians or tribes, or have spoken to them at different times. Such realisatic sentiments may also be expressed, and were scored, on the basis of responses that suggested that it would not be possible for the story characters to make divergent claims if they did have access to the same facts or spoke to the same people.

Responses which suggested that the use of or access to different facts <u>might</u> explain the differences in knowledge claims were not in and of themselves judged as sufficient to warrant a score of zero. Also excluded from this level were any statements in response to the initial or subsequent probes which suggested that the opposing claims may be based on other than, or more than, differing experience on the part of the story characters. Any such statements effectively ruled out a level 0 designation and were considered for scoring at higher levels.

<u>Level 1: Dogmatism; Selective Attention or Strategic Selection</u>. Once it had been determined that the subject considered more to be involved in the construction of the problem of competing knowledge claims than differential access to the facts, and scoring at level 0 had been ruled out, a level 1 designation of the statement was considered. Subjects were scored at this level to the extent that they showed an

appreciation of the fact that one's history contributes to their
understanding of the facts. At this new level, persons' thoughts are
seen to be of two types; (1) direct representations of reality, or
objective facts and (2) reflective considerations about those
representations or subjective opinions. While at level 0 opinions were
considered as byproducts of incomplete access to reality, at this level
opinion comes to be seen as a part of a disinct value relative domain
made up solely of such things as values, preferences, and biases.
Opinions and other such related elements of thought, are no longer seen
by level 1 subjects to be derived from experience. While the process by
which facts are gathered is still understood by them to involve a direct
reading off of experience, subjective opinions and preferences are
viewed more existentially. Whatever their origins such opinions are seen
by level 1 subjects to lead people to be strategically selective of the
facts they gather and/or report when stating their case. The problem
that this fact/opinion dichotomy creates for subjects at this level is
that they may be misled if they are forced to rely upon other peoples'
claims, because they have no easy way of knowing when they are being
given a well rounded or unbiased account of the facts.

Responses scored at this level clearly indicate that the subject
assumes that there is often more to disagreement than simple
differential access to the facts. To be scored at this level a statement
had to go beyond any straight forward reliance on objective fact and
instead assign some or all of the responsibility for the conflicting
knowledge claims to the particular opinions, values, preferences or
biases of each story character. Included at this level were all
statements to the effect that the subjective opinions exressed by the

story characters lead them to strategically present only that sub-set of the facts in their possesion which best support their own claims. In a slightly different but related vein, responses scorable at this level may also claim that peoples' biases, strong beliefs, or preferences sometimes pre-dispose them to attend more to those facts which support their opinions or prejudices than to those which contradict them. At this level, subjective opinion is held apart from the domain of objective facts. Consequently, statements to the effect that all that is involved whenever parties disagree are such matters of opinion or preference were also scored at this level. Statements were also scored at level 1 when it was clear that thoughts were dichotomously divided into the subjective and objective, and where it was at least implied that the two could be kept separate. Counter indications for responses scored at level 1 were any suggestion that the distinction between facts and opinions or subjective and objective matters is blurred. Any suggestion that one's opinions may intrude upon the actual knowing process in ways that render it a constructivistic rather than a perceptual or realistic process were read as indicative of some higher level response and ruled out a level 1 classification.

Level 2: Skepticism: Meaning is in the Mind of the Beholder. The problem of competing knoweldge claims, as it is constructed at this level, is particularly acute. What is appreciated at this, but not at previous levels, is that one's reflective thoughts, or second order representations, do not comprise a category of knowledge on the same level as one's representations of reality, but are, instead, understood to be the second order lenses through which one views and assigns meaning to the world. The distinction between facts and opinions thus is

no longer a simple sorting problem but involves a hierarchical judgement in which values and opinions are seen to stand above, rather than beside the facts. The effect of this hierarchicalization is to break down the previous objective/subjective dichotomy, while at the same time expanding the class of subjective opinion to include virtually all knowledge. As at level 1, biases, values, preferences, and opinions still effect the claims one makes, but at this level they do so by being directly implicated in the knowing process and colouring or determining how experiences will be understood. Any statements which located opinions and the like directly in-line in the knowing process were consequently scored as reflecting a level 2 construction of the problem. Statements scored at this level include claims that opinions may not be held at bay and that because they are directly implicated in the knowing process an objective view of the facts is seen as difficult if not impossible. Also included at this level were claims that who or what kind of person one is may determine the manner in which one sees or hears things. This had to be distinguished, however from the level 1 consideration that one's personality is an indication of one's likes and dislikes.

The key scoring distinction between this and other levels is that at level 2 people's opinions, biases, and points of view are seen to be an inextricably part of the knowing process. They thus, necessarily effect what one sees, thinks, and claims. The problem of divergent knowledge claims is thus viewed as one resulting from a person relative construction and not simply due to some divergence in perceptual experience.

Solution Strategies

The scoring criteria to be presented below apply to those responses that subjects offer as solution to the problem of divergent knowledge claims that they previously identified during the first part of the interview. As with the scoring of the problem construction phase, the scoring of these proposed resolutions proceeds stepwise through a process in which an attempt is made to match each response to a list of criterial statements representative of Levels 0 through 3.

Level 0: Realism: "What Problem?" As was described in the problem construction section, subjects coded at the zero level see all problems of competing knowledge claims as both transient and trivial. Because such competing claims are seen to be the product of different experience on the part of the protagonists, sorting things out requires little more than getting all the necessary information together in one place. Which of two alternatives is seen to be correct is either regarded as obvious (i.e., one of the protagonists has more information than the other), or requires only that the claimants compare notes to decide which of them is privy to the most facts. "Solutions" which are also scorable at this level are dismissive remarks that reflect the level 0 belief that such disagreements would not be possible under the conditions of equal access to information that are implied in the stimulus stories.

Experts at this level are held to be useful in sorting out such disagreements only to the extent that they may have had broader experiences than either claimant in the story. Any suggestion that no solution is possible or that some special perspective might be required to sort out such competing claims contra-indicates a level 0 designation

and led to the response being considered for higher level classification.

Level 1: Dogmatism: Objectivity and Compromise. The problem of resolving competing knowledge claims at level 1 is viewed as one of determining who to trust. What makes this a problem at this level is that while objective facts are still seen to be potentially available, it is appreciated that much of one's knowledge is derived indirectly through the experiences of others. In addition, peoples' subjective opinions, preferences, and values are understood to often lead them to either selectively present only those facts which lend support to their own claims or may have lead them to look in one direction as opposed to another and to consequently become less than completely informed. Because both of these assumptions presuppose that the knowing process is only indirectly affected by such subjective considerations, objective knowledge is still taken to be possible, in principle, though often difficult to aquire. Three coping strategies may be seen to follow from this construction of the problem.

The most obvious solution, given such continued adherence to a realistic epistemic stance, is to find out which claim is correct by going and looking for one's self. The only cautionary admonitions required by such "see-for-yourself" prescriptions, are reminders to "be objective" or, more to the point, thorough in looking at all the facts. Any statement to the effect that looking objectively or for oneself will allow one to resolve the competing knowledge claims should be scored at this level.

Subjects at this level sometimes appreciate, however, that it is not always possible to go and look for oneself. When this is not

possible, due to lack of time or opportunity, the epistemic problem is often keenly felt by level 1 subjects. That is, when forced to rely upon second hand information one is seen to be in the serious jeopardy of being mislead. The problem from this perspective is one of trust and the repair for it is to find some disinterested third party who, by virtue of their neutral stance may be trusted to consider the array of available facts in an open minded or unbiased manner. Experts are most often valued at this level for their neutrality, though value neutrality is by no means a trait restricted to experts.

All statements which emphasise the importance of disinterest or unbiasedness as a factor in the trustworthiness of a source of second hand information should be scored at level 1. At this level second hand information is a substitute for first hand experience and so the only concern is with the credibility of the source. Any suggestion that bias or personal interest are endemic to the knowing process contradict a level one designation and were considered for scoring at levels 2 or 3.

The final solution strategy scorable at this level amounts to an attempt on the part of the subject to dodge the epistemic implications of such disagreements. As was detailed in the earlier section concerned with problem construction, the Level 1 subjects' tendency to dichotimize the contents of thought into facts and opinions enables young people at this level to dismiss certain divergent knowledge claims as being epistemically irrelevant on the grounds that they concern only matters of opinion. Such constructions of the problem are matched by a level 1 coping strategy in which the problem is reduced to one of competing interest and compromise is seen as the only way of settling dissagreements. Consequently, statements which suggest that compromise

between opposing views or interests is all that is possible are scored at this level. In such situations, experts sometimes may be valued as mediators on the grounds that they might facilitate an amicable settlement of such anassuagably different views. Talk of compromise should only be scored at this level when the level 1 distinction between fact and opinion is explicitly made. Instances where compromise is held out as a resolution strategy when matters of fact rather than opinion are at stake were considered for scoring at levels 2 or 3.

Level 2: Skepticism; Non-Rational Solutions. As outlined in part one of this scoring section, subjects at level 2 read all conflicting knowledge claims as a reflection of a wholesale relativism in which subjective opinions, preferences, and biases so suffuse the knowing process that judgements as to the relative merits of one claim over another are seen as groundless. At this level, the potential incommensurability of knowledge claims is accepted in principle and understood, when it occurs, to be unresolvable. This acceptance of subjective relativism as an in-line feature of the knowing process disallows any simple appeal to facts or first hand experience as a means of resolving differences of opinion. Given this constructivistic view of the knowing process, all direct access to material facts is assumed to be lost. The epistemic problem faced by such subjects is no longer one of trust but the more imposing one of interpretation.

One possible way of coping with this new found relativism is to dogmatically assert that while most people lack the grounds for deciding which of two claims has the greater merit, certain experts who are specially placed or trained are excused from the usual limitations that characterize everyone else. The priviledged insights or special methods

of such experts are assumed to allow them access to an absolute truth denied to everyone else. Scored at this level were any suggestions that experts, by virtue of their training, methods, or experience were not (in level 1 fashion) simply in possesion of more facts, actually have a deeper, more priveledged understanding of the issue than do others. Accounts of the "scientific method" that took it as an approach excused from the limitations imposed on all more casual methods of understanding were scored at this level.

The alternative coping strategy possible at this level amounts to total acceptance of the skeptical implications of relativised truth. Such a skeptical stance involves the belief that there are no rational grounds on which to decide which of two competing claims to believe and carries with it the implication that one must either refuse to make a decision, on the grounds that there are no criteria for doing so, or, if pressed to proceed, make such decisions on other nonrational grounds. The solution strategies scored at this level included statements to the effect that one can simply believe whatever one wants. When compromise is proposed by such subjects it is only understood as a way of moving things along without any attendant hope that it could bring one any closer to the truth.

Scored at level 2, then, were all statements to the effect that there are no ironclad ways of knowing what to believe or how to choose between competing knowledge claims. The defining feature of this type of level 2 response is, then, an acceptance of the total loss of possible objectivity as a basis for rational choices, and the willingness to accept other arbitrary and nonrational strategies as a means of proceeding in the absence of absolute truth.

Distinguised from these sorts of non-rational coping strategies and contra-indicative of a level 2 designation, were any suggesttions that it might be possible to proceed rationally despite the loss of all direct contact with the world as it is in itself.

Level 3: Post-Skeptical Rationalism: Learning to Procede in the Absence of Absolute Truth. The sort of rational resolution strategies scored at level 3 were first of all grounded in a level 2 acceptance of the relative nature of knowledge. At this level, as at level 2, the fact that persons with identical experiences often make different knowledge claims is taken as confirmation of the fact that the knowing process is necessarily constructive and person relative. Unlike their level 2 counterparts, however, persons at level 3 do not despair of rational grounds for proceeding in the face of such generic doubts but hold, instead, that the relative merits of differing claims may be evaluated on rational grounds which need not be tied to any objective or absolute understanding of the truth.

Consequently, any response which both acknowledged the essential relativity of knowledge and also went on to support the view that competing claims could still be evaluated in terms of such things as internal consistency, validity, scope of coverage, or general sensibility were scored at this level. A skeptical stance with regards to the disagreement in the stories was taken to be an essential feature of responses scored at this level. This restriction was necessary to avoid confusion between these and level 1 responses which focussed upon the subjective character of opinion but did not include the possibility that grounds might still exist for sorting out good from bad opinions.

APPENDIX D

Objective Measure of Ego Identity Status:

Instructions and Sample Items

Objective Measure of Ego Identity Status (OM-EIS)

Instructions

Read each item and indicate to what extent it reflects your own thoughts and feelings. If a statement has more than one part, please indicate your reaction to the statement as a whole. Indicate your answer by drawing a circle around one of the following choices.

6 = strongly agree

5 = moderately agree

4 = agree

3 = disagree

2 = moderately disagree

1 = strongly disagree

Sample OM-EIS Items in Each Content Domain

Ideological Domain

Occupation

Diffusion. I haven't chosen the occupation I really want to get
into, and I will work at whatever is available until something
better comes along.

Foreclosure. My parents decided a long time ago what I should go
into for employment and I'm going to follow through with their
plans.

Moratorium. I haven't decided what to do for an occupation. There
are so many that have possibilities.

Achieved. It took me a while to figure it out, but now I really
know what I want for a career.

Religion

Diffusion. When it comes to religion, I just haven't found anything
that appeals and I don't really feel the need to look.

Foreclosure. I attend the same church my family has always
attended. I've never really questioned why.

Moratorium. I'm not sure what religion means to me. I'd like to
make up my mind but I'm not done looking yet.

Achieved. A person's faith is unique to each individual. I've
considered and reconsidered it myself and know what I can
believe.

Politics

Diffusion. I haven't really considered politics. It just doesn't
excite me much.

Foreclosure. I guess I'm pretty much like my folks when it comes to
politics. I follow what they do in terms of voting and such.

Moratorium. I'm not sure about my political beliefs, but I'm trying
to figure out what I can truly believe in.

Achieved. Politics is something that I can never be too sure about
because things change so fast. But I do think it's important to
know what I can politically stand for and believe in.

Philosophical: Life Style

Diffusion. There is no single "life style" that appeals to me more
than another.

Foreclosure. My parents' views on life are good enough for me, I
don't need anything else.

Moratorium. I'm looking for an acceptable perspective for my own
"life style" view, but I haven't really found it yet.

Achieved. After considerable thought I've developed my own
individual viewpoint of what is for me an ideal "life style"
and don't believe that anyone will be likely to change my
perspective.

Interpersonal Domain

Friendship

Diffusion. I don't really have any real close friends, and I don't
    think I'm looking for one right now.
Foreclosure. I only pick friends that my parents would approve of.
Moratorium. There's a lot of different kinds of people. I'm still
    exploring the many possibilites to find the kind of friends for
    me.
Achieved. I've tried many different friendships and now I have a
    clear idea of what I look for in a friend.

Dating

Diffusion. I don't think about dating much. I just kind of take it
    as it comes.
Foreclosure. I only go out with the kinds of people my parents
    expect me to date.
Moratorium. I'm trying out different types of dating relationships.
    I just haven't decided what is best for me.
Achieved. Based on past experiences, I've chosen the type of dating
    relationship I want now. '

Sex Roles

Diffusion. I've never really seriously considered men's and women's
    roles in a relationship (marriage). It just doesn't seem to
    concern me.
Foreclosure. My ideas aboutg men's and women's roles come right
    from my parents and family. I haven't seen any need to look
    further. ·
Moratorium. There's so many ways to divide responsibilities in a
    relationship (marriage), I'm trying to decide what will work
    for me.
Achieved. There are many ways that married couples divide up
    responsibilities. I've thought about lots of ways and now I
    know exactly how I want it to happen for me.

Recreation

Diffusion. Sometimes I join in leisure activities, but I really
    don't see a need to look for a particular activity to do
    regularly.
Foreclosure. I've always liked doing exactly the same recreational
    activities as my parents do and I haven't seriously considered
    anything else.
Moratorium. I've been trying out a variety of recreational
    activities in hopes of finding one or more I can enjoy for some
    time to come.
Achieved. After trying a lot of different recreational activities
    I've found one or more I really enjoy doing by myself or with
    friends.

Chandler, M. and Boyes, M.C. (1982) Social-cognitive
    development. In B. Wolman (Ed.), Handbook of
    developmental psychology, Englewood Cliffs, N.J:
    Prentice Hall.

Williams, T.M. and Boyes, M.C. (1986) Televison viewing
    patterns and the use of other media. In T.M. Williams
    (Ed.), The impact of televison: A natural experiment
    in three communities. New York: Academic Press.

Chandler, M., Boyes, M.C., Ball, L., and Hala, S. (1986)
    The conservation of selfhood: A developmental analysis
    of children's conceptions of self-continuity. In T.M.
    Honess and K.M. Yardley (Eds.), Self and identity.
    London: Routledge and Kegan Paul.

Chandler, M., Boyes, M.C., Ball. L., and Hala, S. (1986)
    Identity formation across the ages: A developmental
    analysis of the issues of continuity and commitment.
    The British Columbia Psychologist, 2.

Boyes, M.C. and Walker, L. (in press, 1987) The
    implications of cultural diversity for the universality
    claims of Kohlberg's theory of moral reasoning. Human
    Development.