A STUDY OF MORAL DEVELOPMENT

WITH SPECIAL REFERENCE TO PSYCHOLOGICAL NEEDS,

HUMAN RELATIONSHIPS AND STRUCTURES OF JUDGMENT

By

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Nature is not always kind to us. Nevertheless, the warmth and inspiration that I felt deeply when I was being loved, pacified, encouraged, taken care of, and helped in one way or another by so many people from different countries have demonstrated to me the good and beautiful side of Nature. It is only with both love and universal justice that we shall ultimately be free from despair, hostility, jealousy, prejudice, and mental and physical illness; and thus we shall be able to self-actualize ourselves, that is, to be ourselves. It is only at that stage the human species as a whole will be able to comply with Nature in the most harmonious way. This is what I have learned from all of those who have kindly helped me in the past few years.

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ABSTRACT

This study consists of two parts: the first part is the establishment of a theoretical model of moral development and the second part is an empirical study which includes the construction of a new psychological test called The Moral Development Test (MDT).

The proposed theory postulates the following three parameters to explain the fundamental nature of moral development: Basic Psychological Needs (Parameter N), Human Relationships (R) and Structures of Judgment (J). Different current theories are applied in the elaboration of the above three parameters: Humanistic Psychology particularly Maslow's Theory for N, Sociobiological Theory of Kinship for R and Cognitive-developmental theory for J. The theory is a 7-stage model. In addition, an attempt is made to employ the Chinese Tao Philosophy in the primitive establishment of a theoretical basis for the Ultimate Stage of Human Development i.e. Stage 7 in the theory. The derivation of the theory is mathematically oriented.

The MDT is constructed mainly for validating the above theoretical model. Each form of the MDT consists of five or six hypothetical dilemmas. The questions for each dilemma are divided into two parts. Part I is used to test the Parameters N and R and Part II the Parameter J.

It was found that the test-retest and internal consistency reliabilities of the major MDT indices (labelled as NRRJ and WNRRJ indices) were usually in the 0.80s to 0.90s. The face validity, convergent-divergent validity and the construct validity have been demonstrated to be good. In addition, results of cross-cultural analyses using the English (London) and Chinese (Hong Kong) samples also support the cultural universal hypothesis of the present theoretical model. Nevertheless, the MDT only explores features of moral development up to the fifth stage of the present 7-stage model.

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APPENDIX

MICROFICHES

1. The Psychology of Moral Development: An Introductory Overview*

The study of morality has long been a most important topic in philosophy. However, the systematic study of moral development in psychology only started in the past few decades, with rapid improvements in the past twenty years or so. In some sense, moral psychology is only in its stage of childhood at the present time.

The main objective of this chapter is to outline some of the common concepts of morality in psychology and to present an introductory overview of the current theories of moral development.

1.1. Some Common Concepts of Morality in Psychology

The concept of morality has been extensively studied by both Eastern and Western philosophers throughout history. Western philosophers such as Plato, Socrates, Aristotle, Kant, Bentham, Mill, etc. and Chinese philosophers such as Confucius, Mencius and many others have dealt with the concept of morality in detail and have given us many insights into the complexities of the problems involved.

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*A substantial part of this Chapter is based on Chapters 1 and 2 of the author's M.A. dissertation (Ma, 1980). Chapter 2 of the author's M.A. dissertation appears as Appendix 1(A) in this thesis.

However, it is beyond the scope of this thesis to give a presentation of the philosophers' concept of morality. This study is predominantly a psychological one, therefore, it will focus more on the interpretation of the concepts of morality given by psychologists, although the work of the sociologist , Durkheim, will be considered because of his influence on cognitive developmental psychologists.

In the following paragraphs, some common concepts of morality will be discussed briefly.   They will be elaborated in further detail in either Appendix 1(A) or Chapter 2.

(1) Psychoanalysts tend to define morality as a force that is negative to life and love; a force that causes mental illness and death. Gilligan (1976, p.145) defines morality as:

> "action and thought motivated by a sense of compulsion or obligation rather than by love (spontaneous inclination or wish), and by a negative wish to avoid painful feelings (shame or guilt) rather than by a positive wish to express feelings of love".

(2) Behaviourists tend to link morality with social conditioning or social conformity. Eysenck (1976) defines conscience as a "conditioned reflex" in his Biological explanation of morality. He argues that:

> "by calling a variety of actions bad, evil, or naughty, we encourage the child to identify them all in one category, and to react in the future with anxiety to

everything thus labelled." (Eysenck, 1976, p.109)

(3) The concept of morality in the Cognitive Developmental
Approach is elaborated in detail by Kohlberg (1981,
1971, 1969). Basically speaking, the concept is
constructed on Kant's moral philosophy and Rawl's
(1971) theory of justice. A detailed explanation of
this concept is given in Section 2.3.3.

(4) Morality can also be defined in terms of altruism
and social norms or moral rules. Wright (1971)
writes:

"moral rules are foundational in the sense that they
are concerned with the maintenance of, for instance,
trust, mutual help and justice in human relationship.
.... Moral rules form the yardstick against which we
evaluate the rules of any particular activity".
(p.13).

It follows that

"moral behaviour consists of all the various things
people do in connection with moral rules." (p.15)

A more detailed elaboration of the concept of morality
in terms of empathy, altruism and social norms is given
in Section 2.2.

(4) Durkheim (1925) argues that there are three elements
of morality: (i) discipline - a spirit shared generally
by members of the group (ii) attachment to those social
groups of which one is a member and (iii) autonomy or

self-determination.   He elaborates the last element
as follows:

"We must have knowledge, as clear and complete as
awareness as possible of the reasons for our conduct.
This consciousness confers on our behaviour the
autonomy that the public conscience from now on
requires of every genuinely and completely moral
being". (Durkheim, 1925, p.120)

In other words, such moral behaviour "must be
freely desired, that is to say, freely accepted"(p.120).

1.2. An Overview of Current Theories which have a bearing
on Moral Development.

The term 'theory' is used loosely here; any fairly
systematic thoughts on moral development is regarded as a
'theory'.

18 current theories which have a bearing on Moral
development are discussed in this thesis. Some of them
are elaborated in Chapter 2 and some in Appendices 1(A)
and 1(B). These theories are grouped in Figure 1.1 in
three categories: (1) Feeling or Emotional aspect
(2) Behavioural aspect and (3) Cognitive aspect. It is
important to note that:
(i) the list is by no means exhaustive, the criterion for
selection is basically a subjective one
(ii)Not all the theories in the list deal with moral
development directly and explicitly. Some of them
are placed here mainly because of their strong relevance

to the study of moral development.

(iii)The categorization of the theories is not entirely
rigorous because of the complexity of the topic and
the preliminary nature of development of some of the
theories.

The following figure is constructed mainly to present
a very rough and simple picture of the current theories
listed in Table 1.1. The lines indicate the relationships
between the various theories and the three basic aspects
of moral development.

The present study seeks to establish relationships
between parameters derived for the three fundamental
aspects. The parameters are:

(i) Psychological Needs (labelled as Parameter N),

(ii) Human Relationships (Parameter R) and

(iii)Structures of Judgment (Parameter J) (See Chapter 3).
These parameters are placed within a theoretical model
(labelled as *TMD in Figure 1.1) which is tested in the
empirical part of this study.

TABLE 1.1

The 18 Current Theories

	TITLE OF THE THEORY	SOME MAJOR REFERENCES
1.	Psychoanalytic Theory	Gilligan (1976)
2.	Behaviouristic Theory	Eysenck (1976)
3.	Cognitive Developmental Theory	Piaget (1932);Kohlberg (1969,1971,1976,1981)
4(a)	Social Learning Theory	Bandura(1977),Bandura & Walters (1963)
4(b)	Cognitive Social Learning Theory	Mischel & Mischel (1976)
5.	Theory of Empathy and Altruistic Motivation	Hoffman (1976,1978,1979)
6.	Normative Theory of Altruism	Berkowitz (1972); Schwartz (1977)
7.	Sociobiological Theory of Kinship and Altruism	Wilson(1975);Trivers(1970; Hamilton(1964)
8.	Typological Theory of Moral Judgment and Socialization	Bronfenbrenner (1962; Garbarino & Bronfenbrenner (1976)
9.	Bull: Moral Judgment Theory	Bull (1969)
10.	Selman: Social Perspective Taking Theory	Selman (1976)
11.	Simpson: Holistic Theory	Simpson (1976)
12.	Socioanalytic Theory	Hogan et. al. (1978)
13.	Dialectic Theory	Baumrind (1978), Meacham (1975)
14.	Cybernetic Theory	Pugh (1977)
15.	Loevinger: Ego Development Theory	Loevinger (1966,1976)
16.	Erikson: Psychosocial Development Theory	Erikson (1963)
17.	Social Exchange Theory	Blau(1964);Homans(1961, 1968)Thibaut & Kelly(1959)
18.	Maslow's Theory of Human Motivation	Maslow(1968,1970,1971)

Notes:
(1) Theories 3,5,6,7,14,17 and 18 are elaborated in Chapter 2; Theories 1,2,4,8,10,11 and 16 in Appendix 1(A); and theories 9,12,13 and 15 in Appendix 1(B).

Figure 1.1 Current Theories Having a Bearing on Moral Development

MORAL DEVELOPMENT AND BEHAVIOUR

COGNITIVE ASPECT

BEHAVIOURAL ASPECT

FEELING ASPECT

8. Typological ~

3. Cognitive-developmental ~

13. Dialectic ~

10. Selman's ~

9. Bull's ~

17. Social Exchange ~

12. Socio-analytic ~

2. Behaviouristic ~

4a. Social Learning ~

4b. Cognitive Social Learning ~

7. Sociobiological ~

6. Normative ~

14. Cybernetic ~

Mathematical Approach

Oriental Thought

* TMD

18. Maslow's ~

11. Simpson's Holistic ~

1. Psychoanalytic ~

5. Hoffman's ~

16. Psychosocial ~

15. Ego Development ~

Notes:
(1) '~' = Theory.
(2) For further details, see Table 1.1.

2.   Moral Development: Its Nature and Measurement.

While the first chapter provides an overview of
the major current theories of Moral Development, this
chapter gives a more detailed review of the literature
directly relevant to this study.   The first three sections
(2.1 - 2.3) give a background literature review for the
theoretical model constructed in the next chapter.   Section
2.1.describes the Humanistic Approach in the study of
Psychological Needs, in particular, Maslow's theory
of Human Motivation and the concept of self-actualization
will be elaborated in detail .   Section 2.2 gives a
brief description of the concepts and origins of altruism
and human relationships.   Some emphasis   is   placed
on the Evolutionary and Sociobiological Theories.   In
Section 2.3, the Cognitive Developmental Theory of
Morality is reviewed in detail .

A primitive attempt to introduce Tao Philosophy
in the study of the Ultimate Stage of Human Development
is   carried out in   Section 2.4.   Finally, Section 2.5
outlines the details of   the Moral Judgement and Decision
System of Man as a Value-driven system, which has a
genetic origin.

2.1 Psychological Needs

Psychological studies of instincts, drives and needs have led to the establishment of a large number of theories of motivation (see, eg Weiner, 1980; Bolles, 1975; Madsen, 1974). However, the objective of this section is to provide the background literature review for the theory established in Chapter 3 and therefore the discussion will be limited to Maslow's theory of Human Motivation and his concept of self-actualization.

The existential philosophy and phenomenological approach in sociology influenced a group of psychologists in America in the 1950s. These psychologists were highly critical of Freud's negative view of human nature which was based mainly on his clinical studies of neurotic and psychotic subjects. On the contrary, they postulated that human nature is basically good or neutral (Maslow, 1965, p.308-309) and that the study of those mentally ill is limiting. They argued that there should be an emphasis on the importance of studying mentally healthy people. Maslow, a major proponent of this approach, did this in his study of those people considered to be extremely mentally healthy and proposed a theory which includes the concepts of self-actualization, B-cognition, Metamotivation and Transcendence (Maslow, 1968, 1970, 1971).

Under the influence of the writings of K. Goldstein, K. Horney, E. Fromm, G.W. Allport, A. Maslow, C. Rogers

and many others, a "third force" in psychology, which is often called Humanistic Psychology was established. The humanistic psychologists usually take a 'holistic' approach in developing their theories and their research interests are probably best described by the statement of purpose of the Journal of Humanistic Psychology, which states that

> "topics of special interest
> are authenticity, encounter,
> consciousness, self-actualization,
> self-transcendence, search
> for meaning, creativity,
> personal growth, humanistic
> psychotherapy, confluent
> education, values, identity
> and love."

2.1.1 Maslow's Theory of Human Motivation

I. Propositions

Maslow (1970, Chapter 3) puts forward 16 propositions for his theory of motivation. Some of these propositions are better regarded as scientific attitudes or arguments rather than as scientific propositions. In the following discussion, an attempt is made to rearrange 13 of Maslow's propositions into 5 general postulates. In order to simplify referencing, P1 to P16 are used to represent Maslow's 16 propositions in the order of his presentation (Maslow, 1970) Appendix 2.1(A) gives the full title of each proposition.

1. Gestalt Postulate of Individual (P1, P12)

In general, the individual is assumed to be an integrated, organized whole. However, Maslow is also aware of the fact that an individual sometimes does not behave as an integrated whole. He writes,

> "Apparently the organism is
> most unified in its integ-
> ration when it is successfully
> facing either a great joy or   ·
> creative moment or else a
> major problem or a threat
> or emergency. But when the
> threat is overwhelming or
> when the organism is too weak
> or helpless to manage it,
> it tends to disintegrate."
> (Maslow, 1970, p.30)

2. Universality of Ultimate Needs (P3, P4, P9)

The unconscious ultimate needs or desires of human being are universal, that is, similar in all people.

These ultimate needs form a sound fundamental base for the classification of motivational life.

3. Fundamental Nature of Motivation (P5, P6, P13)

Not all human behaviours are motivated. For those motivated behaviours, the underlying motivations are always multiple, fluctuating and complex.

4. Hierarchy of Needs and Drives (P7, P8)

Human needs are arranged in a hierarchy of prepotency. Similarly, drives are arranged in a hierarchy of specificity.

5. Environmental Influences on Motivation (P11, P14, P15)

Human motivation is actualized in behaviour under the influence of environment. For instance, people have been taught by experience to be realistic, that is, to "yearn consciously for that which might conceivably be actually attained" (Maslow, 1970, p.31). It is also postulated that reality exerts an influence on the unconscious impulses or motivations.

In addition, three of Maslow's propositions (P2, P10, and P16) described below are regarded as scientific attitudes or arguments rather than as scientific postulates:

(i) P2:   The choice of hunger as a paradigm for all other motivational states is regarded as problematic. One main reason is that hunger is "different from other motivations in that it has a known somatic base, which is unusual for motivational states" (Maslow, 1970, p.20). In other words, the hunger drive is atypical rather than typical in human motivation.

(ii) P10: "Motivation theory must be anthropocentric rather than animalcentric" (P.27). That is,

the use of animal data as a base for theorizing human nature is debatable.

(iii) P16:The highest capacities of the healthy and strong people should be studied in parallel with those psychologically abnormal ones.

II. The Theory

1. Maslow's Hierarchy of Basic Needs

Maslow (1970) hypothesizes a hierarchy of Basic Needs as follows:

		Degree of Prepotency
Lower Needs ↓	Physiological Needs	HIGHEST ↓
	Safety Needs	
	Belongingness and Love Needs	
	Esteem Needs	
Higher Needs	Self-actualization Needs	LOWEST
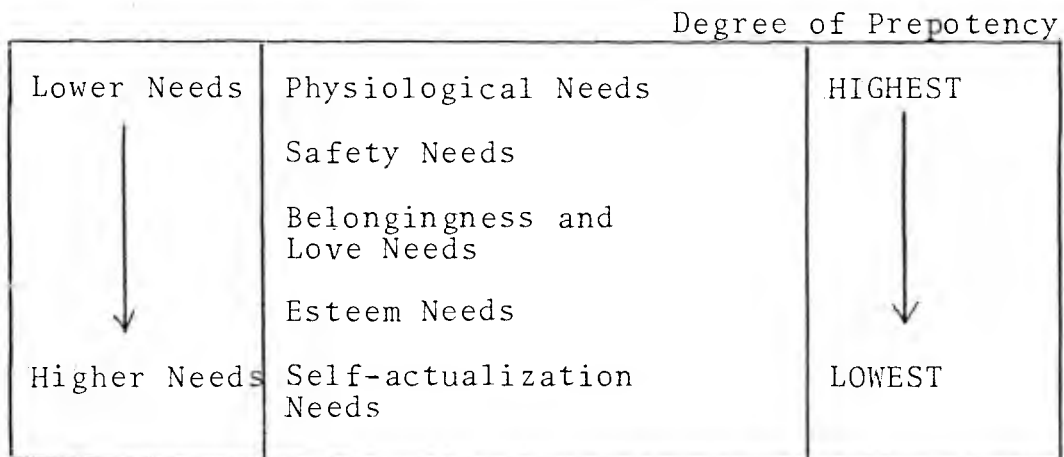
A detailed description of the above basic needs by Maslow (1970) is given in Appendix 2.1(B).

Cognitive and Aesthetic Needs

In addition to the above five basic needs, Maslow (1970) also hypothesizes two other needs, namely, cognitive needs and aesthetic needs, of which he says that little knowledge is known. Cognitive needs refer to the desires "to satisfy curiosity, to know, to explain, and to understand" (p.38). He also argues that cognitive needs are similar to the above basic needs in the sense that they are themselves conative. Similarly, the aesthetic needs refer to the needs for beauty. He further elaborates: "The needs for order, for symmetry, for closure, for completion of the act, for system, and for structure may be indiscriminately assigned to either cognitive, conative, or aesthetic, or even to neurotic needs." (p.51)

2. The Emergence of New Needs

According to Maslow (1970), if all the basic needs are unsatisfied and the organism is dominated by physiological needs, then all the other needs are suppressed. On the other hand, if the lower needs are satisfied, higher needs will emerge. In other words, the above five basic needs are arranged in a hierarchy of relative prepotency. However, this does not mean that a need must be "100% satisfied" before another need emerges. (See Section 3.2). Maslow argues that people generally have a higher percentage

of satisfaction in lower needs and a lower percentage of
satisfaction in higher needs. He also asserts that the
hierarchy of Basic Needs is not necessarily a fixed order
for all people. Exceptional cases are possible and
"explainable" by other supplementary arguments. For
example, some people may value 'self-esteem' as more
important than 'love'. Maslow argues that such people
are often strong, powerful, self-confident or aggressive.
they "seek high esteem and its behaviour expressions
more as a means to an end than for its own sake; they
seek self-assertion for the sake of love rather than for
self-esteem itself." (P.52)

3. The origin of Basic Needs

   According to Maslow (1970), all basic needs are
supposed to be instinctoid and innately given. That is,
they "are in some sense, and to some appreciable degree,
constitutional or hereditary in their determination".
(P.88)

4. Universality of Basic Needs

   Maslow argues that basic needs are "more ultimate,
more universal, more basic than the superficial conscious
desires, and makes a closer approach to common human
characteristics" (p.54-55). In short, Maslow does not
claim that basic needs are universal for all cultures

and that the order of the hierarchy of basic needs is
the same for all persons. Instead, he argues that the
extent of such universalities is probably the highest
in the field of motivational studies.

5. Higher and Lower Needs

The basic needs are divided into two categories:
Growth Needs and Deficiency Needs. Growth needs refer
to self-actualization needs and deficiency needs to all
the others. In addition, Maslow calls those needs with
a higher degree of prepotency in the hierarchy as lower
needs (e.g. physiological and safety needs) and those
with lower degree of prepotency higher needs (e.g. esteem
needs and self-actualization needs.) He hypothesizes 16
propositions regarding the differences between higher and
lower needs (Maslow, 1970, p.98-100). Only the first
two of them are mentioned here, as they are concerned
with the developmental aspects of basic needs. First of
all, it is argued that the basic needs form a progressive
evolutionary developmental pattern. The lower needs pre-
cede the higher needs in phyletic or evolutionary deve-
lopment. Maslow (1970) argues that "the higher the need
the more specificially human it is" (p.98). Secondly,
the basic needs form an ontogenetic developmental pattern
with the lower needs developing first. That is, lower needs
will develop in infancy and childhood; higher needs
usually appear at a later age.

2.1.2   The Concept of Self-actualization

The concept of self-actualization is one of the central themes of Humanistic Psychology. Broadly speaking, self-actualization means one's desire or tendency to actualize or fulfill one's potential. K. Goldstein (1939) refers one's potential or capacities as one's "nature". He argues that the tendency "to actualize 'itself', is the basic drive, the only drive by which the life of the organism is determined" (p.196). An example of self-actualization given by Goldstein (1939) is the need to complete incomplete actions and the urge to perfection. Goldstein uses the terms "perfection" and "imperfection" in a very broad sense. He argues that the driving force underlying self-actualization "is given in the experience of imperfection - be it thirst, hunger or experience of being able to fulfill any performance which seems to be within our capacities - the goal is the fulfillment of the task". (Goldstein, 1939, p.205)

Inspired by Goldstein's work, Maslow develops a theory of self-actualization, which is the focus of discussion in this section.

Characteristics of Self-actualizing People

Maslow (1970, Chapter 11) proposes 15 characteristics of self-actualizing people. After extensive psycho-historical investigation, he composes a list of

public and historical figures that can be regarded as
self-actualizers. Among the list of self-actualizers,
there are "2 fairly sure historical figures (Lincoln in
his last years and Thomas Jefferson)" and "7 highly
probable public and historical figures (Einstein, Eleanor
Roosevelt, James Addams, William James, Schweitzer,
Aldous Huxley and Spinoza)" (Maslow, 1970, p.152).

In the following paragraphs, Maslow's 15 charac-
teristics of self-actualizing people are summarized into
6 general features. (See also Appendix 2.1(C))

(Abbreviation used: SAP = Self-actualizing Person)

1. SAP as a social being (S1, S2, S5, S10, S13)

SAPs tend to have superior and efficient perception
of reality, they have "an unusual ability to detect the
spurious, the fake, and the dishonest in personality,
and in general to judge people correctly and efficiently"
(p.153). In addition, they can accept themselves and
others "in the stoic style, with all its shortcomings,
with all its discrepancies from the ideal image without
feeling real concern." (p.155)

In general, they have deeper and more profound in-
terpersonal relationships with others than non-SAPs. They
show more concerns, greater love and more perfect iden-
tification. They also have a philosophical, unhostile
or positive sense of humour. On the other hand, SAPs

tend to have a need for privacy, a need for detachment,
a need for being alone and solitary without causing
harm or discomfort to others.

2. SAP as a moral and democratic being (S11, S12)

SAPs are fair, democratic people who always know
how to discriminate clearly between means and ends, and
between good and evil.

3. SAP as a broad-minded humanistic being (S4, S6, S9,
    S15)

SAPs tend to show a deeper identification with
human species as a whole. They have some mission
in life; some tasks that "they must do or want to do".
Their missions and tasks are largely concerned with the
good of mankind in general. They tend to be more inde-
pendent of the physical and social environment,. that is,
more independent of their cultural influences or show
a higher degree of autonomy in thought and behaviour.

4. SAP as a creative being (S14)

ALL SAPs are highly creative in one way or the other,
for example, in science, music, art, philosophy etc.

5. SAP as a child-hearted being (S3, S7)

SAPs always behave with a high degree of spontaneity, simplicity and naturalness, which are common in young children's behaviour. They have also "the wonderful capacity to appreciate again and again, freshly and naively, the basic goods of life, with awe, pleasure, wonder and even ecstasy ...." (p.163)

6. SAP as a peak experiencer (S8)

Peak experience - moments of self-actualization, states of being or transcendence of the self, is one of the important concepts in Maslow's theory.

Peak experience can be defined as moments during which most of the characteristics described above are experienced more fully. In other words, one feels more open, more creative, more humorous and more ego-transcending during such episodes. In Maslow's words, the SAP "becomes in these episodes more truly himself, more perfectly actualizing his potentialities, closer to the core of his being, more fully human." (Maslow, 1968, p.97). In general, SAPs show a much higher frequency of peak experience than non-SAPs.

According to Maslow, there are two types of SAPs: Transcending and non-Transcending ones. For further discussion, see Section 2.4.1.

FInally, it should be emphasized that SAPs are not
entirely perfect people, there are moments during which
SAPs are "boring, irritating, petulant, selfish, angry,
or depressed." (Maslow, 1970, p.176).

Self-actualization as a Process of Psychological Growth

As mentioned before, the self-actualization need
can be regarded as a growth need and the process of self-
actualization is a process of psychological growth. But
how does growth take place? Maslow (1968) argues.

> "Growth takes place when the
> next step forward is subjec-
> tively more delightful, more
> joyous, more intrinsically
> satisfying than the previous
> gratification with which
> we have become familiar and
> even bored...." (p.45)

That is to say, growth occurs simply because we
subjectively like it to occur or we prefer the next step
to the present one. In short, "the new experience vali-
dates itself rather than by any outside criterion. It
is self-justifying, self-validating." (Maslow, 1968, p.45)

2.13 Empirical Studies of Maslow's Theory

I. Maslow's Hierarchy of Basic Needs.

An early review by Cofer and Appley (1964) concludes
that only the two lower levels of Maslow's Hierarchy,

that is the Physiological and Safety Needs, are clearly
supported by empirical evidence (p.684). More recently,
in a review of ten factor-analytic and three ranking
studies testing Maslow's Hierarchy, Wahba and Bridwell
(1976) write,

> "This literature review shows
> that Maslow's Need Hierarchy
> Theory has received little
> clear or consistant support
> from the available research
> findings. Some of Maslow's
> propositions are totally re-
> jected, while other receive
> mixed and questionable sup-
> port at best." (p.2.33)

Indeed, there are very few empirical studies which
lend support to the whole of Maslow's Hierarchy. Very often,
experimental psychologists find difficulties in operation-
alizing Maslow's five basic needs and tend to regroup them
into four or less categories. For example, Graham and
Balloun (1973) grouped Maslow's five Basic Needs into 4
categories: Physiological, Security, Social and Self-
actualization needs and used three different methods of
data collection in their study. They found that data
collected by two of the three methods used supported
Maslow's theory. Studies by Mathes and Edwards (1978)
and Mathes (1981) suggest that Maslow's Hierarchy should
be reduced to two or three levels or categories. Mathes
(1981) suggests that Maslow's Hierarchy should be re-
vised to "contain only three levels - physiological,
belongingness, and self-actualization - with security and
esteem as superfluous." (p.71) This suggestion is similar
to Alderfer's (1972). As a result of little empirical

support for Maslow's Hierarchy, Alderfer (1972) proposes a hierarchy of three needs only: Existence, Relatedness and Growth needs. The theory is called E.R.G. theory. Alderfer (1972) argues that his theory is better than Maslow's theory on empirical grounds (p.53).

More recently, Goebel and Brown (1981) studied Maslow's Hierarchy of Needs by constructing a test called the Life Motivation Scale, which requires subjects to rank statements representing Maslow's five needs (Physiological, Security, Love, Self-esteem and Self-actualization needs). A sample of 111 subjects, aged 9 to 80 years old was used. Dividing the subjects into five age groups (children, adolescents, young adults, middle-aged adults, old adults), an analysis of variance (AGE x SEX) was performed. It was found that there were significant age differences for four needs. On the other hand, the results are said to give limited support to Maslow's Hierarchy as a developmental sequence because they do not show clear-cut and consistent developmental trends.

II. Maslow's concept of self-actualization

Apart from Maslow's own empirical work (see e.g. Maslow, 1970, Chapter 11; 1968, Chapter 6), the other important empirical study of self-actualization is probably Shostrom's (1964) Personal Orientation Inventory (POI). The POI consists of 150 two choice comparative

value judgements. Items were constructed based on the
theoretical work of Maslow, Rogers, Fromm, Horney and
many others. There are 12 scoring categories or dimen-
sions, which include, for example, (i) Self-actualizing
value: "Measures affirmation of a primary value of self-
actualizing people" (Shostrom, 1964, p.209) (ii) Self-
regard: "Measures affirmation of self because of worth
or strength" (p.209) (iii) Self-acceptance. (Measures
affirmation or acceptance of self in spite of weakness
or deficiencies." (p.209) The measure is claimed to
discriminate effectively self-actualizing subjects from
non-self-actualizing ones. A large number of researches
have been done using this test (See Shostrom, 1980).

One major defect of the POI as a measure of
Maslow's concept of self-actualization is that it misses
a number of important concepts in Maslow's theory.
"For example, the POI fails to sample the ethical compo-
nent of self-actualization or to reflect some of Maslow's
five distinctions between appropriate and inappropriate
(or realistic and unrealistic) forms of guilt, spontaneity,
nonconformity, disregard for others and the expression of
hostility" (Oakland et. al., 1978, p.76). Thus, it is
difficult to say to what extent the POI measures Maslow's
concept or in technical terms, the construct validity of
the POI as a measure of Maslow's concept of self-actuali-
zation is probably low.

2.1.4. A Critical Discussion of Maslow's Theory

There are two major defects in Maslow's system:

(i) Vague Concepts

Many important concepts in Maslow's theory are vaguely or loosely defined or constructed. For example, the concept of need itself. Wahba and Bridwell (1976) write,

> "It is not clear what is
> meant by the concept of need.
> Does need have a psycholo-
> gical and/or physiological
> base? Does a need come to
> existence because of defi-
> ciency only or does need
> always exist even if it is
> gratified? How can we iden-
> tify, isolate and measure
> different needs?"
> (p.234)

Another example is the concept of self-actualization. Maslow likes to use lots of adjectives or loosely defined terms to elaborate a point or to describe a situation. This does not help other psychologists to understand or operationalize his concepts. It sometimes misleads them. Therefore, Cofer and Appley (1964) urge that the pre-requisite for further development of the concept of self-actualization "is the formulation of the important ideas in language that is relatively precise." (p.692)

(ii) Problemetic empirical methodology

Though Maslow elaborates his concepts in very re-fined detail , he has not established a scientific

empirical system to test or validate his theory. Very
often, the data collected by him act as a source of
stimulation for constructing theories rather than as
a source of empirical facts testing his theory. This
practice leads him to ignore occasionally the scientific
strictness of empirical methodology. For example, (i) In
a study of peak experience, Maslow (1968) writes, "No one
subject reported the full syndrome. I have added together
all the partial responses to make a 'perfect' composite
syndrome" (p.71). (ii) Maslow's study of self-actualization
using a group of historical and public figures as subjects is
criticized for selecting a sample of people he admired
and "eliminated people with gross pathology - the
Dostoyevskis and Van Gogh" (Smith, 1973, p.24). This
implies that Maslow's "empirical definition of psycholo-
gical health or self-actualization thus rests, at root,
on his own implicit values that underlie this global
judgement." (Smith, 1973, p.24). In other words, the
systematic biases in the sampling of his self-actualizing
subjects in principle damages the universality of his
concepts of self-actualization.

Unless the methodology is greatly improved, it is
difficult to construct a scientific theory of man based
on Humanistic Psychology in general and Maslow's Theory
in particular.

Despite the above shortcomings, Maslow's theory is
worthy of intensive study. It is highly original and it
helps bridge the gap between philosophy and psychology;
ideology and reality. Its influence on current psycholo-
gists is broad and profound.

2.2 Human Relationships and Altrusim.

The objective of this section is limited to the exploration of a base for the construction of a heirarchy of Human Relationships in terms of altruism. In addition, an overview of different theoretical studies of altruism is also given.

Consider a person A interacting with another person B in a social situation S. It is argued that the moral behaviour of A depends on the relationship between A and B. For example, the probability of carrying out an altruistic act by A to B is much higher if B is the parent of A than if B is a stranger to A in similar social situation S. In other words, some people are more important to A than others. The problem is: who are important and who are not? Why is this so?

2.2.1 The Biological Basis of Human Relationships and Altruism.

Evolutionary theorists and Sociobiologists attempt to answer the problem in terms of natural selection.*

Sociobiology, as defined by Wilson (1975), is "the systematic study of the biological basis of all

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* The following key terms relevant to the discussion in this section are explained briefly in Appendix 2.2 : Altruism, Genetic Fitness, Genotype, Inclusive Fitness, Natural Selection, Phenotype, Social Evolution.

social behaviour."(P.4) Its central theoretical problem

is "how can altruism, which by definition reduced personal

fitness, possibly evolve by natural selection?" (Wilson,

1975, p.3) The answer provided by sociobiologists is

kinship. In general, sociobiologists argue that

> "When any behaviour under
> study reflects some com-
> ponent of genotype; animals
> should behave so as to
> maximize their inclusive
> fitness. In most cases this
> is achieved by maximizing
> the production of success-
> ful offspring."
> (Barash, 1977, p.63)

The above quoted statements are tentatively called

the Central Theorem of Sociobiology by Barash. More ex-

plicitly, the evolution of altruism is explained in terms

of group selection, kin selection, parental manipulation

and the development of reciprocal altruism.

(1) Group Selection and Kin Selection

The concepts of group selection and kin selection

were originated by Charles Darwin in "The Origin of

Species" for the explanation of the evolution of sterile

workers castes of insect societies. If the sterile in-

sects contribute significantly to the welfare of the

fertile insects, then natural selection at the group

level is possible and probably inevitable. If the group

is a family, the selection is called kin selection. The

concept of kin selection is often regarded as a more accep-

table view than that of group selection "because of the

greater commonality of genetic makeup among close rela-
tives" (Staub, 1978, p.27). According to Wilson (1978),
"the closer the genetic relationship of the members of
a group, the more stable and intricate the social bonds
of its members." (p.73) In addition, sociobiologists also
argue that the concept of kinship can be applied to all
species. (Barash, 1977, p.85)

A central concept of kin selection is established
by Hamilton (1964).

Consider a person A carrying out an altruistic
act to another person B.

Define

$$k = \frac{\text{Recipient B's benefit}}{\text{Altruist A's cost}}$$

r = Coefficient of relationship between
    altruist A and recipient B, summed for
    all recipients
  = Proportion of genes in A and B that
    are identical because of common descent.

(For further explanation of r, see e.g., Wilson (1975)
p.74-75; Barash (1977), p.85-87).

Hamilton argues that the genes for altruistic be-
haviour will be selected if $k > \frac{1}{r}$.

Suppose B is a brother of A, that is $r = \frac{1}{2}$,
half of B's genes are identical to A by common descent,

and therefore $k > 2$. Suppose in extreme case the altruistic act causes A to leave no offspring but the act "more than doubles the brother's personal representation in the next generation, it will ipso facto increase the one-half of the genes identical to those in the altruist, and the altruist will actually have gained representation in the next generation." (Wilson, 1975, p.118) In other words, the genes of the altruist A is selected at family level. That is, altruistic behaviour in such cases is favoured in terms of natural selection because the inclusive fitness is increased rather than decreased.

The following table 2(A) is constructed based on Hardin (1977, p.13) and Barash (1977, p.316).

(2) Parental Manipulation

Consider an example given by Ruse (1979, p.47). A parent has five children; it is impossible for all of them to survive. However, if the parent tries to manipulate one of the children to act as an altruist who will eventually be self-sacrificed for the benefit of the other four children, then all the other four will survive. Sociobiologists claim that genes causing such parental manipulation are strongly favourdd by natural selection. (see e.g., Barash, 1977, p.95; Alexander, 1974).

Kin Selection and Parental Manipulation are similar, however, there is a major difference between them. In Kin

TABLE 2(A): Genetic Basis of Kin Altruism.
(Sources: Hardin (1977) and Barash (1977)

Social Relation-ships in Primi-tive Human Cultures	Relationships	r	
Household	Self; identical twins, members of same clone	1	GREATER
	Parent and child; full sibs	$\frac{1}{2}$	
Identified Relatives	Grandparent and child; half sibs; uncle and nephew; aunt & niece; double first cousins	$\frac{1}{4}$	*Genetic rela-tedness
	First cousins	$\frac{1}{8}$	*Likelihood of reciprocation
Village mem-bers. Tribe members Different tribes		Less than $\frac{1}{8}$ and slightly greater than 0	*Power of group and/or kin selection
	"Unrelated" members of the same species	Nearly 0	
	Members of different species	0	LESS

Notes:

1. r is the coefficient of relationship mentioned above. It is also referred as "Genetic kinship" by Hardin (1977,p.13).

2. It is obvious that no two members in the same species "can be absolutely unrelated", therefore the value of Γ for "unrelated" members of the same species is nearly but not exactly zero. (Barash, 1977, p.85)

3. Clone is defined as "A population of individuals all derived asexually from the same single parent". (Wilson, 1975, p.581)

Selection, a person A helps another person B because they are related, that is, B will pass on to the next generation the genes identical to those of A. On the other hand, in Parental Manipulation, A helps B because A is manipulated by his/her parent C to do so.

(3) Reciprocal Altruism

According to Trivers (1971), reciprocal altruism can be selected even when the recipient is not closely related with the altruist. That is, Kin Selection is not applicable in this case. In addition, sociobiologists argue that reciprocal altruism can operate between members of different species. Reciprocal altruism is selected if the performance of altruistic behaviour results in "a return of altruistic behaviour towards the original altruist such that the ultimate benefit in units of inclusive fitness is greater than the cost." (Barash, 1977, p.94) Consider a hypothetical example given by Trivers (1971, p.190):

> A person X is drowning and another person Y is
> going to rescue X.
> Chance of X being drowned to death = 1/2
> Chance of Y being drowned to death if he tries to
> rescue X = 1/20
> Suppose, in the later time, Y is drowning and X
> reciprocates, and suppose the risks of drowning
> remain the same, then it will benefit both of them
> if they play the role of rescuers because, with

reciprocal altruism, each of them reduces the chance of being drowned to death from 1/2 to 1/20 x 2 = 1/10.

"A population at large that enters into a series of such moral obligations, that is, reciprocally altruistic acts will be a population of individuals with generally increased genetic fitness." (Wilson, 1975, p.120)

Similarly, the concept of reciprocal altruism can also be applied to explain one's general tendency to like others and to form friendships with those one likes. Trivers (1971) also argues, "Selection will favour liking those who are themselves altruistic" (p.213)

Strictly speaking, reciprocal altruism cannot be regarded as a kind of altruism similar to that involved in Kin Selection and Parental Manipulation because it is basically selfish.

The Debate of Sociobiology

As usual, any study of man is controversial; Sociobiology is no exception. There are numerous criticisms of sociobiology by anthropologists, psychologists and philosophers of different schools of thought. (see e.g., Montagu (Ed.) (1980, particularly the introduction by Montagu, p.3-14); Campbell (1975); Ruse (1979, particularly Chapter 9: Sociobiology and Ethics); Freedman (1979, particularly the first and last chapters); Caplan (Ed.)

(1978, particularly the debate between Marxists and Wilson, p.259-269 and p.280-303, and Ruse's paper, p. 355-375); Wilson (1975, particularly chapter 27: Man: From Sociobiology to Sociology); Wilson (1978)).

The debate (nature vs nurture or biology vs culture) is complex. In the following paragraphs, the claim of sociobiologists and the objections given by Montagu (1980) and Campbell are discussed briefly.

Sociobiologists claim that human social behaviour is genetically determined. (Wilson, 1978, p.19). Wilson (1978) writes:

> "Can the cultural evolution
> of higher ethical values gain
> a direction and momentum
> of its own and completely
> replace genetic evolution?
> I (E.O. Wilson) think not.
> The genes hold culture on
> a leash. THe leash is very
> long, but inevitably values
> will be constrained in
> accordance with their
> effects on the human gene
> pool."   (p.167)

Higher ethical values refer to, for example, Kohlberg's Stage 6 thinking. In short, Wilson (1975) argues that it is the right time to attempt to biologicize ethics now. (p.562)

Many anthropologists (see e.g., Montagu (Ed.)(1980); Sahlin, 1976; Cohen, 1972) disagree strongly wih the socio-biologists' claim. Montagu (1980) argues that it is true

that human social behaviour has a genetic base but this does not mean that such behaviour is genetically determined. He also argues that the behaviour of an organism is developed through the interaction between the organism and environment and not between the genes and environment. "In short, it is the action of the environment upon the organism that influences and makes possible the functional expression of the genes." (Montagu, 1980, p.11)

In a study of intergroup conflict and altruistic behaviour, psychologist Campbell (1965) argued that an external threat to a society increases its ingroup solidarity and individuals' "ethnocentric self-sacrificial loyalty" and that the origins of altruism are based on both biological and sociocultural evolution. Later on, Campbell (1972, 1975) changed his original argument and proposed that human social behaviour is culturally determined rather than biologically determined. He argues that sociobiology explains altruism in humankind at a level which is "below the biosocial optimum, the level functionally adequate for society." (Staub, 1978, p.32) Campbell (1975) writes:

> "Social evolution has had
> to counter individual
> selfish tendencies which
> biological evolution has
> continued to select as a
> result of the genetic
> competition among the
> cooperators."
>   (p.1115)

On the other hand, a number of researchers (see e.g. Durham, 1978; Freedman, 1979) propose that human social behaviour is both biologically and culturally determined. In other words, they believe that the base of altruism is both biological (or genetic) evolution and social (or cultural or sociocultural) evolution.

2.2.2 The Psychological Study of Altruism and Human Relationships.

The study of altruism in psychology is quite extensive (see e.g., Wispe, Rosenhan and Bryan (Ed.), 1972; Macaulay and Berkowitz (Ed.), 1970; Krebs, 1970; Staub, 1978, 1979; Bar-Tal, 1976).

The psychoanalytic theorists attempt to explain altruistic behaviour in terms of attachment. It is argued that man has a strong tendency to form "deep and long-lasting attachments" (Wright, 1971, p.129) which greatly intensify altruistic tendencies. On the other hand, behaviourists argue that altruism is a habit or a product of social conformity, which is learned by conditioning process. Social leaning theorists (Aronfreed, 1968, 1969; Rosenhan, 1969; Rosenhan and London, 1968) explain altruistic acts in terms of modelling, positive experience and observational learning.

Recent works include the study of the development of empathy and altruistic motivation (Hoffman, 1976, 1977,

1978, 1979; see also reviews in Deutsch and Madle, 1975;
Shantz, 1975). On the other hand, empirical psychologi-
cal studies testing part of or the whole of the theory
of Human Relationships or kin altruism (see Table 2(A))
as postulated by sociobiologists are not many. In general,
these studies deal with a small part of the hierarchy
(see e.g., Sawyer, 1966; Ma, 1980; reports in Freedman,
1979).

I. Theoretical Studies of Altruism

Basically, there are four major theoretical approach-
es in the study of altruism: (1) The origins of altruism:
Biology vs Culture (see Section 2.2.1) (2) Social Exchange
Theory. (3) Normative Approach (4) Emotional or Empathic
Approach. The following discussion gives an overview of
the last three approaches.

Social Exchange Theory

Social exchange is defined by Blau (1964) to be the
"voluntary actions of individuals that are motivated by
the returns they are expected to bring and typically do
in fact bring from others." (p.91) Exchange theorists
(Blau, 1964; Homans, 1961, 1968; Thibaut and Kelley,
1959) argue that when people interact, they tend to recip-
rocate with one another in a way so as to maximize rewards
and minimize costs. In other words, altruism is a means

for future rewards or it is a type of "social investment."
On the other hand, Homans (1961) argues that if altruism
forms part of one's value, one may gain self-satisfaction
by acting altruistically. In this case, the reward is
self-satisfaction and the cost is self-sacrifice or loss
in the altruistic act. Homans (1961) writes, "so long
as men's values are altruistic, they can take a profit
in altruism too" (p.79).

It can be argued that the social exchange theory
in psychology and Trivers' theory of reciprocal altruism
in sociobiology are quite similar in basic concepts; or
to put it in another way, Trivers' theory can be said to
form a genetic or biological basis for the Social Exchange
theory.

Normative Approach

Social norms can be defined as "a set of expecta-
tions members of a group hold concerning how one ought
to behave". (Bar-Tal, 1976, p.42) Psychologist and
sociologists have attempted to explain prosocial and al-
truistic behaviour by different social norms. Some of
the major ones are briefly described as follows:

(1) Norm of Reciprocity

Gouldner (1960) argues that there is a norm of
reciprocity which is universal and can be found in all

value systems. The norm of reciprocity is generally
postulated to be: "(1) people should help those who have
helped them, and (2) people should not injure those who
have helped them." (Gouldner, 1960, p.171). In an ex-
perimental study, Wilke and Lanzetta (1970) found
that "The amount of reciprocated help is a monotonic
increasing function of the amount of prior help", which
supports Gouldner (1960) and exchange theorists' models.

(2) Norm of Giving

In contrast with Gouldner's norm of reciprocity,
Leeds (1963) proposes a norm of giving which takes into
account of those people who may not be able to reciprocate,
for example, "the very young, the very old and the
very sick" (p.229). The norm of giving is a norm of al-
truism. According to Leeds (1963), it consists of three
criteria (See also Appendix 2.2(A)) (i) The giver must
treat the act of giving as an end in itself. That is,
the giver must not expect rewards in future, (ii) The
act is a voluntary one, (iii) The act "is doing good"
(p.230-231).

(3) Norm of Social Responsibility

A major proponent of the Normative Approach is
Berkowitz (1972; Berkowitz and Daniels, 1963, 1964)) who
suggests that there exists a norm of social responsibility

which prescribe people "to aid those who are dependent
upon them" (Berkowitz, 1972, p.68) In addition, people
help others "not for tangible gains or social approval,
but supposedly primarily for approval from themselves".
(p.68) In other words, if they do not offer the help,,
they would have a feeling of guilty and dissonance because
they violate the norms of social responsibility which is
supposed to be part of their own moral code.

(4) Personal Norms

     Schwartz (1973, 1977) proposes a theory of personal
norms. The term "personal norms" refers to "the self-
expectations for specific action in particular situations
that are constructed by the individual". (Schwartz, 1977,
p.227) The personal norms are closely related to the self-
concept. If one acts against one's personal norms, one
would feel self-depreciated and of course guilty too.
According to Schwartz's theory, whether one would act
altruistically in some specific situations would depend
on"the intensity of moral (personal) obligation"
(Schwartz, 1977, p.227). The feelings of such moral ob-
ligation may be generated "by the activation of the indi-
vidual's cognitive structure of norms and values". Or "may
be neutralized prior to overt action by defenses against
the relevance or appropriateness of the obligation" (p.227)

     A strong criticism of the Normative Approach is
made by Darley and Latane (1970). According to this

critique, one major defect of the Normative approach is that it attempts to explain social behaviour by a number of different norms; "this diversity of norms seriously weakens their explanatory usefulness" (Darley and Latane, 1970, p.85) because almost any kind of behaviour can be regarded as normative - if it does not fit norm A, it would fit Norm B or some other norm. Another difficulty is that some norms appear to contradict one another and are often vague. (p.85-87) In addition, empirical studies do not always support the Normative Theory. In short, it is argued that altruistic or prosocial behaviour "is too complexly determined by situational factors to be accounted for by norms." (p.99)

Schwartz theory of personal norms can be said to be an attempt to overcome some of the major difficulties described by Darley and Latane. Further study is required for justification of Schwartz's approach.

Emotional or Empathic Approach

The emotional aspect of altruistic behaviour has generated lots of interests among psychologists (see e.g., review in Deutsch and Madle, 1975; Shantz, 1975; Hoffman, 1976). On the other hand, very few psychologists attempt to present a developmental theory of empathy. M.L.Hoffman (1976, 1978, 1979) is an exception. Hoffman's developmental theory postulates four hypothetical levels of

empathic response based on the cognitive development of a sense of the other by the child. According to Hoffman (1976), empathy is defined as "the involuntary, at times forceful, experiencing of another person's emotional state". (p.126) The following table 2(B) summarizes the essential points of Hoffman's theory. Selman's Social Perspective Stages are included for reference.

Very few empirical researches testing directly Hoffman's theory have been carried out. Thompson and Hoffman (1980) using semiprojective stories in the study of the development of guilt in children report that their results provide modest support for Hoffman's theory. On the other hand, Hoffman is regarded as having taken "a giant stride" in integrating the cognitive and affective aspects of empathy and altruism into a theoretical model. (Lickona, 1976, p.20)

II. Sex and Age Differences in Empathy and Altruism

Apart from the cognitive factor studies in, for example, Hoffman's theory of Empathy and Schwartz's theory of Personal Norms, individual differences in empathy and altruism can also be accounted for by sex, age, social class, personality etc. (see e.g. Krebs, 1970) In the following paragraphs, we describe briefly the sex and age differences.

TABLE 2(B)

Hoffman's Theory of Empathy

Stage	Approximate age range	Development of a sense of the other (social role-taking)	Development of Empathy	Illustrative Examples
1.	0-1 year	Unable to differentiate between self and other	Unclear who is actually in distress; behave as though "what is happening to the other is happening to them" (Hoffman, 1978, p.182)	"an 11-month-old girl, on seeing a child fall and cry, looked like she was about to cry herself and then put her thumb in her mouth and buried her head in her mother's lap, which is what she does when she is hurt". (Hoffman, 1979, p.962-963.
2	1-2 year	Person-Permanance: able to distinguish other as a physical entity	aware that it is the other person and not the self is in distress, however, no awareness of the other person	"an 18-month-old boy fetched his own mother to comfort a crying friend, although the friend's mother was also present (Hoffman, 1979, p.963)
3.	2 years to middle childhood	aware that other person's thought and feeling may be different from the self's; the	aware that the real world may be different from their perception and that other's inner states	"By about 4 years most children respond with appropriate affect and can recognize

Stage	Approxima-te age range	Development of a sense of the other (social role-taking)	Development of Empathy	Illustrative Examples
		early stage of role-taking (Approximately Selman's stage 0 & 1*)	are independent of theirs; able to project their feelings to others or to imagine themselves in the other's position.	signs of happiness or sadness in others in simple situations" (Hoffman, 1978, p.183)
4	Middle-child-hood to Late child-hood	aware of self and others being different persons with their own histories and identities (Approximately Selman's Stage 2 & 3)	able to "respond empathically not only to others' transitory, situation-specific distress but also to what they imagine to be other's general condition" (Hoffman, 1978, p.184)	Children at this stage may show more intensified empathic response to the chronic rather than transitory distress of another person.

*See Appendix 1(A)

(1) Sex differences

According to a review by Krebs (1970), most of the studies found no sex differences in altruism. Among the 12 studies which did find sex differences in altruism, as reviewed by Krebs, 5 of them favoured males and 7 of them favoured females. Similarly, Maccoby and Jacklin (1974) in a review of about 30 studies conclude that their "survey of research on attachment, affiliation, and positive interactions of all kinds has shown surprisingly little sex differentiation". (p.225) However, Hoffman (1977) in a review of a studies on sex differences in empathy (vicarious affective arousal) found that all of them showed sex differences in favour of females. Hoffman (1977) suggests that this may due to the fact that females show greater tendency to imagine themselves in other's position while the males tend "to act rather than feel, even in the situations that call for feeling". (p.720). In addition, Hoffman and Levine (1976) argue that most of the studies reviewed by Maccoby and Jacklin (1974) used measures which are predominantly cognitive, for example, "judgements of other's feelings in different situations; communicative egocentrism" (p.558) They found that studies using affective empathy index did show sex differences in favour of girls.

(2) Age Differences

According to Krebs' (1970) review, studies compar-
ing the incidence of altruism in children showed age
differences. Because different studies used different
tasks; explored different dependent variables and did
not base their studies on a general school of thought,
comparisons of different studies are often difficult and
problematic. Nevertheless, most of these studies showed
that older children tended to exhibit a larger number of
incidences of altruism than the younger one.

Based on Krebs' (1970) review, we attempt to plot
the results of three of the studies on the following
graph:
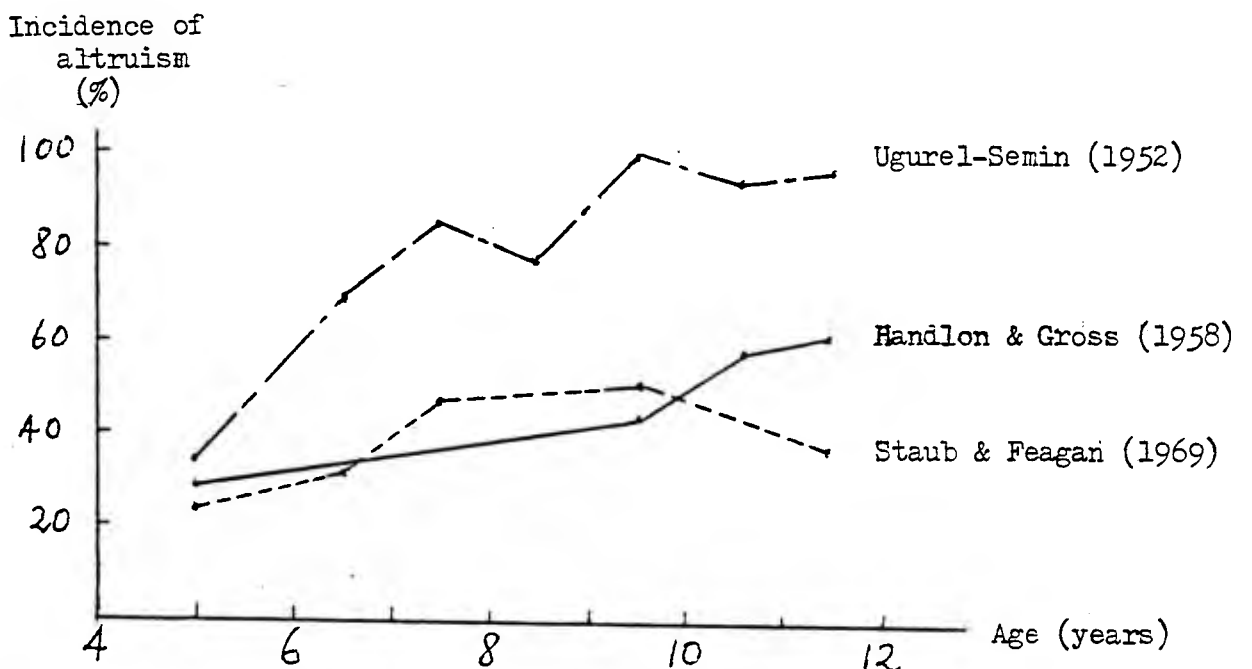
Figure 2.1. Age Differences in Altruism

In addition, as mentioned before, Thompson and
Hoffman (1980) found some developmental changes in
children's reasons for guilt. They reported that "older

children exhibited more concern for the victim's welfare"
(p.156) and more frequent use of internal justice principle
whereas younger children paid more attention to detec-
tion and punishment.

III. Empirical Studies of Human Relationships or Kin
Altruism.

As mentioned at the beginning of this section, there
are very few psychological studies testing sociobiologists'
theory of Human Relationships or kin altruism. We propose
to call sociobiologists' theory, the theory of Human
Relationships, because with Trivers' theory of reciprocal
altruism, sociobiologists' theory can be generalized to
deal with all human social interaction and hence involves
all human relationships in general, kin altruism in
particular.

In the following paragraphs, three relevant empiri-
cal studies of human relationships are described, two of
them are unpublished.

(1) Sawyer (1966)

Sawyer (1966) established an altruism scale which
"assesses the value one places upon the welfare of another
in relation to his own". (p.407) He used two hypotheti-
cal situations and asked the subjects either to rank

their preferences for various outcomes for themselves and for the other or to estimate its value on a scale from -1.0 to +1.0 or both.

One hypothetical situation is to ask the subject to imagine that he/she and another student were attending a university course for credit. The assessment of the course is in terms of the grades A, B or C. The subject is asked (i) to indicate his/her preference for each of the combinations of grades for himself/herself and the other student (i.e. both A; self A, other B; self A, other C etc) and (ii) to estimate a value from -1.0 to +1.0 by tenths (e.g. +1.0: "I am equally interested in how good his grade is and in how good my grade is"; +0.5: "I am half as interested in how good his grade is as I am in how good my grade is" (p.412) etc.). The first measure is called preference Ranking and the second one the direct Scale Estimation. The Other Person is first sup- posed to be one of the subject's best friends; and then is altered to be a stranger and finally an antagonist.

Using a formula hypothesized by him, Sawyer calcula- ted an index "a", which he called the measure of relative altruism (ranging from -1.0 to +1.0), from the subject's preference rankings. Multiplying "a" by 100 will give the "altruism value" of the subject by preference ranking method. Similarly, multiplying the value obtained by the Direct Scale Estimationwill give another "altruism value" of the subject. An average of these two altruism values is called the "mean altruism" of the subject. Using 3

college groups (N = 122), Sawyer found that the mean al-
truism toward friend, stranger and antagonist is as
follows: Friend (45); Stranger (12); and antagonist
(-18).

Thus the result provides some support to the
Sociobiologists' claim.

(2) Sebastian (1973)

In a study examining Trivers' theory of kin and
non kin altruistic behaviour, Sebastian (1973; reported
in Freedman, 1979, p.114-115 and p.208) used one of
Kohlberg's story: "Heinz and the drug" with an alternation
of the relationship between Heinz and the woman from
Husband-Wife to (i) father-daughter and (ii) friends.
33 eighth grade children were tested. 79% of the subjects
justified the stealing for case (i) and only 55% for case
(ii). In addition it was found that subjects "felt
stealing a lifesaving drug for a relative was morally
justified, whereas a similar theft for a nonrelative was
morally wrong" (reported in Freedman, 1979, p.114). It is
argued that "with kin, the primary issue was saving a
life; with nonkin, more often the issue was stealing"
(In Freedman, 1979, p.208).

It is worthwhile to remark here that Freedman (1979,
p.113-115; p.208-210 (Study No.46, 47 and 49) reported
a number of unpublished studies done by university students
on kinship and human relationships. Almost all these

studies provide substantial support for sociobiologists'
claim of kin altruism.

(3) Ma (1980)

Ma (1980) attempted to study the differences bet-
ween the first-person (self) and third-person (other)
views of moral judgment by constructing a Moral Consistency
Test based on five of the Kohlberg's Moral Dilemmas. The
test consists of 23 questions, two of them are relevant
to our discussion here. The questions are concerned with
the story "Heinz (Philip) and the Drug" (For the content
of the story, see Appendix 5(D))   (In Ma's study, the
name Heinz was changed to Philip for the English Sample)
and are as follows:

1. Suppose you were Philip. Would you break into
   the shop to steal the drug for your wife?

2. Suppose you were Philip and it was not your wife
   who was dying of cancer but it was someone listed
   below, would you break into the shop to steal the
   drug?

   (i)   Your father/mother
   (ii) Your best friend
   (iii) A stranger.

Subjects are asked to rate on a 7-point scale ranging
from Difinitely YES to Definitely NO.

78 Chinese students in Hong Kong and 213 English
students in London participated in the study. All of
them were either fourth formers or sixth formers. Assuming

1 = Definitely YES, 2 = Strongly YES, 3 = Moderately YES,

4 = Can't Decide, 5 = Moderately NO, 6 = Strongly NO,

7 = Definitely NO, the results are as follows:

TABLE 2(C)

Item No.	Relation-ship	Chinese Mean	(N = 78) Standard Deviation	English Mean	(N = 213) Standard Deviation	t-test between means (signif.)
1	Wife	2.026	1.571	2.155	1.616	
2(i)	Father/ mother	1.949	1.115	2.061	1.614	
2(ii)	Best friend	2.923	1.689	3.075	1.800	
2(iii)	Stranger	5.654	1.634	5.089	1.821	*

*Significant at 5% level.
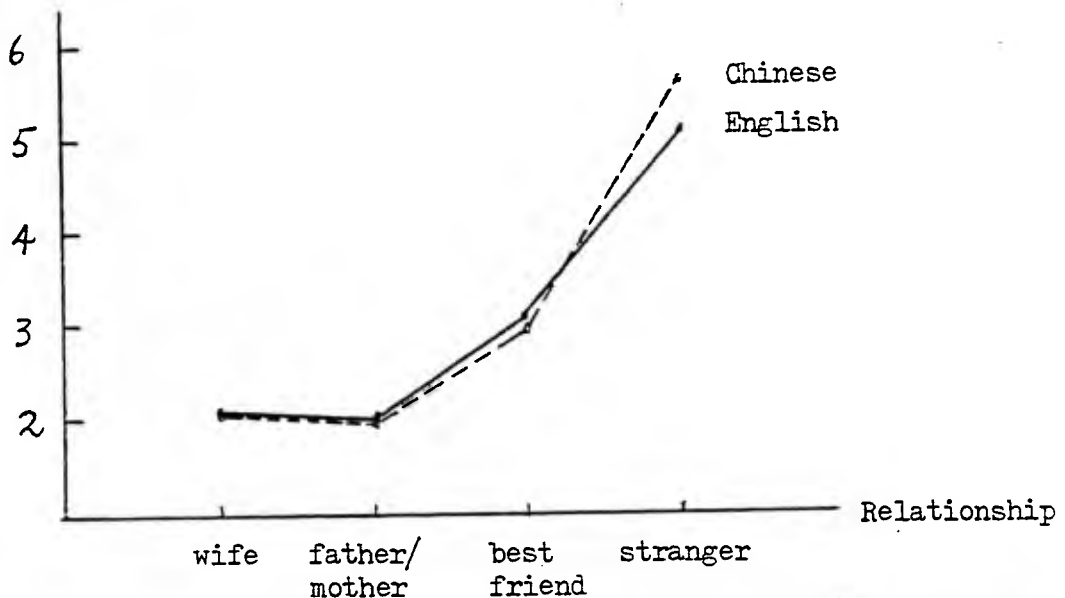
Figure 2.2. A Cross-cultural Study of Human Relationships

The results provide quite strong support for sociobiologists'
claims of kin altruism.

2.3. <u>Structure of Moral Judgment</u>*

The study of moral judgment is probably the most popular
research topic in the field of moral development.   A
number of theories have been proposed (see e.g., Piaget
(1923), Kohlberg (1958, 1969, 1971, 1976, 1980), Bull
(1969), Garbarino and Bronfenbrenner (1976)). The study
of social cognition is also relevant in this case, see
e.g., Damon (ed.) (1978b), Selman (1975, 1976), Lewis and
Brooks-Gunn (1979).

The major objective of this section is to review
the Cognitive Developmental Theory of Morality, which
forms a basis of the theory established in the next
Chapter.   Thus, the discussion here is mainly concerned
with Piaget, Kohlberg and Rest's work.

Although the major influence on the Cognitive
Developmental Approach has been the early work of Piaget
(1932), this approach has roots in the work of the theorists
Durkheim (1925), M. Paul Fauconnet and M. Pierre Bovet
(See Piaget, 1932, Chapter 4).   Also, J. Dewey (1930, 1932)
with his theory of conduct and experience, G.H. Mead
(1934) with his theory of role-taking, J. Loevinger (1966)
with her theory of ego development and J. Rawls (1971)

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* This section is an extensively revised version of Chapter
  3 of the writer's M.A. dissertation (Ma, 1980). Some long
  paragraphs which are slightly revised are put in
  Appendix 2.3 in order to save space here.

with his theory of justice have influenced more recent theoretical development by Kohlberg (1976, 1980) and Rest (1979b, in press). A forgotten pioneer in this field is Baldwin (1906a, 1906b) whose theory of genetic epistemology is fundamental and significant (see also Russell, 1978).

Other psychologists using the concept of stage in the study of moral development and behaviour are e.g. Hobhouse (1906), McDougall (1908), Peck and Havighurst (1960) and Kay (1970).

2.3.1 Basic Assumptions.

I. Basic Assumptions of Piaget's Theory

Piaget's theory of cognitive development forms a basic foundation for the Cognitive Developmental Theory of Morality. It is fair to say that the former is the mother-theory of the latter one. A set of assumptions of Piaget's theory of Cognitive Development is given in Appendix 2.3(A). Further details of Piaget's assumptions can be found in Brainerd (1978, Chapter 2), Flavell (1963,, Chapter 1 & 2) and Piaget (1953, Chapters 1-3; 1971). A review of some major arguments on Piaget's basic assumptions is presented in Vuyk (1981, Chapters 12 and 23). A recent elaborated critique of Piaget's theory is given by Broughton (1981) in a series of five articles.

II. The Concept of Stage

The stage concept is one of the core concept in
Cognitive Developmental Approach. The characteristics of
cognitive stages are summarized in Appendix 2.3(B).
Further details can be found in Piaget (1971, p.16-18),
and Kohlberg (1976, p.47).

In addition, there are two other important features
of Piaget's concept of stage: (1) Preparation and
achievement periods and (2) Horizontal and Vertical
decalages (See e.g. Flavell, 1963, p.21-23; Brainerd,
1978, p.34-37).

Simply speaking, in the preparation period of any
stage, the structures and content characteristics defining
that stage are in the process of formation and organization
and therefore are unstable. In the achievement period,
these structures are developed fully and exist as the
stable structure d'ensemble.

According to Brainerd (1978),

"in its most basic sense, decalage is simply
a name for any invariant sequence between
cognitive contents such that one content
always appears earlier than the other" (p.36)

Horizontal decalages occur within stages and vertical
decalages occur between stages. Specifically speaking,
horizontal decalages "refer to invariant sequences in

two or more versions of a single cognitive content" and vertical decalages refer to "an invariant sequence between two different contents and the contents belong to different stages". (Brainerd, 1978, p.36). In general, different cognitive contents usually correspond to different levels of cognitive functionings. An example of horizontal decalage is the series of concepts of conservation. It is found that children tend to attain the concept of conservation of mass before conservation of weight (See e.g. Flavell, 1963, p.298-299). An example of vertical decalage is given by Flavell (1963, p.23) as follows: a child late in the sensory-motor period can move effi- ciently from A to B to C and then back to A, but it will be several years later before he can represent the above spatial relationships symbolically. In the two cases, namely the motor action and symbolic representation of the immediate surrounding, "there are clear similarities in the reality content and in the formal cognitive organization" (Flavell, 1963, p.23) but they are developed in different ages and stages.

III. Basic Assumptions of Cognitive Developmental Theory
of Morality.

According to Kohlberg, moral judgment develops stage by stage. All the basic features of cognitive stage mentioned above also apply to moral stages. In addition, Kohlberg also postulates the following assumptions (Colby et al. 1979(I) p.2-3; Kohlberg, 1969, p.348-349; Kohlberg,

1976, p.48):

(1) Cognitive judgment is a component of moral action.

(2) Affective and cognitive aspects of moral development
     are parallel and inter-related. "They represent
     different perspectives and contexts in defining
     structural change" (Kohlberg, 1969, p.349)

(3) The basic motivation for moral development is a
     motivation for self-actualization, rather than for
     satisfying biological and safe needs.

(4) Major aspects of moral development are the same for
     all persons and cultures, "because all cultures have
     common sources of social interaction, role taking,
     and social conflict, which require moral integration".
     (Kohlberg, 1976, p.48).

(5) There exists a fundamental whole of personality
     organisation and ego or self development. "While
     there are various strands of social development
     (psychosexual development, moral development, etc.),
     these strands are united by their common reference
     to a single concept of self in a single social
     world". (Colby, et al. 1979(I), p.2)

(6) The formation of moral structures arises through one's
     experiences of role-taking or social interaction.
     Moral stage is characterised by the structures of
     interaction between the self and others.

(7) Environmental influences refer to the general
     pattern of cognitive and social stimulations

available to the child over the whole period of
his development, rather than some specific experi-
ences with his parents or other persons.

(8)   Social or ego development is directed toward "an
equilibrium or reciprocity between the self's
actions and those of others toward the self".
(Colby et al. 1979(I), p.3). The most stable form
of equilibrium is characterised by Kohlberg's stage six
that is, the principle of justice.

IV. Two Stage Models of Moral.Judgment

The following discussion attempts to outline the
main features of the two stage models of Moral Judgment
proposed by Rest (1979, Chapter 3).   In order to simplify
the following discussion, mathematical expressions are
used as far as possible.

Let (1) S_i (i=1,2,3,...n) represent a set of
theoretical stages or types of moral judg-
ment hypothesized. S_n represents the highest
stage defined.

(2) P_i (i=1,2,3,...n) represent the probability
(or percentage, if multiplied by 100) of
using S_i by a subject. Thus $0 \leqslant P_i \leqslant 1$ for
all i.

(3) T_k (k=1,2,3,...)represent the age (in years),
or the mean age of a certain time period
under consideration, of the subject, and
$T_{k+1} > T_k$.

(A) Simple Stage Model

Using the above notation, Rest's (1979b, p.52-54) notion of the Simple Stage Model can be described as follows:

The developmental assessment (D) of a person's level of moral judgment is given by either P_i or (P_i, P_{i+1}). That is, for a person of T_k years old,

$$D (T_k) = P_i S_i + P_{i+1} S_{i+1}$$

with   (i) $1 \leqslant i \leqslant (n-1)$

            (ii) $P_i + P_{i+1} = 1$

            (iii) $0 \leqslant P_i \leqslant 1$

            (iv) S_i varies linearly with T_k
                (i.e. S_i increases linearly with, or
                is constant of, or decreases linearly
                with T_K as k increases)

A graphic representation of the Simple Stage Model given by Rest (1979b, Figure 3.1) is reproduced in Appendix 2.3(C).

It is argued that Kohlberg's measurement is based on this Simple Stage Model and that a number of empirical inconsistencies are found, for example, subject fluctuation. Rest (1979b) argues that although the test-retest relia-bility of Kohlberg's new scoring system: Standard Issue Scoring System (See Colby et. al., 1979) is extraordinary

high (0.90s) (See also Colby et. al, in press, Table 7), about 30% of the subjects show changes in their major/minor stage scores over a two-week period.   He concludes that "subjects are not simply "in" one moral stage or another, but fluctuate within a developmental range". (p.55). For details of other kinds of empirical inconsistencies, see Rest (1979b, p.55-63).

(B) Complex Stage Model

The "all or none" view or "the step by step development through the stages" argument of the Simple Stage Model is criticized as being inadequate and sometimes inconsistent on account of the evidence from empirical data. Rest (1979b) writes,

"The question of developmental assessment should not be, "what stage is a person in?" but rather, "To what extent and under what conditions does a person manifest the various types of organisations of thinking?"" (p.63)

In other words, developmental assessment should be probabilistic. This is exactly the main feature of the Complex Stage Model proposed by Rest (1979b, p.63-67).

Without loss of generality, assume that there are five theoretical stages which are called 'Types' by Rest (1979b, p.65), S_1 to S_5.

The developmental assessment of a subject's level of moral judgment is given by

$$D(T_k) = P_1 S_1 + P_2 S_2 + P_3 S_3 + P_4 S_4 + P_5 S_5 = \sum_{i=1}^{5} P_i S_i$$

with   (i) $P_1 + P_2 + P_3 + P_4 + P_5 = 1$

(ii) $0 \leqslant P_i \leqslant 1$ for all i

(III) S_i varies non-linearly with T_k as k increases.

An illustrative graphic representation of the Complex Stage Model given by Rest (1979b, Figure 3.2) is reproduced in Appendix 2.3(C).

It is obvious that the Complex Stage Model gives more precise and detailed information about a subject's level of moral judgment and Rest's DIT research is based on this model. Simply speaking, the Complex Stage Model tends to sketch out the refined details of a subject's whole pattern of moral judgment while the Simple Stage Model only deals with a subject's dominating stage or type of moral judgment. More research is required in order to justify the efficient and useful application of the Complex Stage Model in the field of Moral Development.

(It is noted here that the theoretical stages or types of moral judgment, S_i used in Rest's (1979b) discussion are explicitly and implicitly assumed to vary with T_k or $D(T_k)$ or 'Development' in Rest's figures. This is indeed a major drawback of the Complex Stage

Model because it means that the S_i curves shown in Rest (1979b, Figure 3.2) are dependent on the characteristics of the sample used, or broadly speaking on the general social, cultural and educational background of the sample used.)

2.3.2   Piaget's Theory of Moral Judgment.

An early influential work in the field of moral development is Piaget's (1932) book: The Moral Judgment of the Child.   In his book, Piaget set up a research paradigm in the study of children's structure of moral judgment.   As usual, Piaget employed the clinical interview technique in this empirical study.   Children were first read a story or a pair of stories about moral events involving other children and then were asked a few questions based on the stories.

According to Piaget, two major stages of moral judgment can be identified.   The earlier stage which occurs before the age of seven or eight is called Heteronomy, Moral realism, or a morality of constraints. The later stage is called Autonomy or a morality of cooperation.

The studies of Piaget generated a great deal of research on moral judgment, which led to the establishment of the cognitive developmental theory of morality. On the other hand, his research also receive criticism.

One major criticism is that Piaget ignores the affective
or non-cognitive aspects of moral development. This
major defect of Piaget's theory was, however, explicitly
acknowledged by him in the foreword of his book (1932):

> "Readers will find in this book no direct
> analysis of child morality as it is practised
> in home and school life or in children's societies.
> It is the moral judgment that we propose to
> investigate, not moral behaviour or sentiments".

Generally speaking, most psychologists (e.g. Bull,
1969, p.151; Bloom, 1959, p.11; Wright, 1971, p.153)
agree that Piaget's contribution is significant and
outstanding.

For a complete and elaborated discussion of Piaget's
theory of moral judgment and criticisms on Piaget's theory,
see Appendix 2.3(D).

2.3.3 Kohlberg's Theory of Moral Development.

I. A Six-stage Theory of Moral Judgment

Based on Piaget's work, Kohlberg constructs an
elaborated and well-known theory of moral development.
He postulates a sequence of six distinct moral stages,
which is invariant for all persons and cultures. Although,
Kohlberg's theory is widely referred to as a theory of
moral development, "it is more properly a description
of the development of moral judgment". (Hersh, et al,

1979, p.45).

The following overview of Kholberg's three levels
and six stages of moral judgment (Kohlberg, 1969, 1976)
should be read in parallel with Appendix: 2.3(E)

Three Moral   Levels

(1) Preconventional Level (Stages 1 and 2)

Most children are at this level.   The individual
is not concerned with the conventional or societal rules
and expectations but only with the concrete or physical
consequence of action.   In other words, the individual
takes a concrete individual perspective, in which "rules
and social expectations are something external to the
self'. (Kohlberg, 1976, p.33).

(2) Conventional Level (Stage 3 and 4)

Most adolescents and adults are at this level.
The individual conforms to conventional rules or
expectations, or authorities.   He takes a member-of-
society perspective, in which "the self is identified
with or has internalized the rules and expectations of
others, especially those of authority". (p.33)

(3) Postconventional Level (Stage 5 and 6)

Only a minority of adults, usually above 20 years old, reaches this level. The individual, in general, accepts conventional or societal rules on the ground that he understands and agrees with the moral principle underlying these rules. In cases where the moral principle is in conflict with the societal rules, he would stick to his self-chosen moral principles rather than obeying the rules. That is to say, he holds a prior-to-society perspective.

The three moral levels are subdivided into six moral stages. Each level consists of two stages, the second is a more advanced and organised form of moral reasoning within each level.

Since the contents of stages 1 to 4 are explicitly and clearly expressed in Appendix 2.3(E), the following discussion concentrates on the elaborations of the higher stages.

The Stage 4 perspective is basically an authority oriented one, it is less autonomous and less basic principle oriented than the perspective of the Stage 5 and 6 because

"(a) it defines no clear obligations to persons outside the order (for example, the nation-state) or to persons who do not recognize the rules of one's own order; and (b) it provides no rational guides to social change, to the creation of new

norms of laws" (Kohlberg, 1971, p.200)

In the elaboration of   Stage 5, Kohlberg (1971)
refers to, Constitutional Democracy and argues that it
makes social law more attractive to a rational person
because it puts one's basic rights prior to law and
society.   Generally speaking,   Stage 5 can be seen as an
outgrowth of the relativist perspective: all values,
norms and morals are arbitrary and relative.   The
emphasis is on the principle of social contract. "The
contract usually represents a compromise, but it allows
each man to pursue his own interest without unduly
interfering with the other's rights to pursue his interest".
(Hersh, et al., 1979, p.78) In addition, contracts are
neutral.   It is regarded as morally invalid or bad only
when it involves an abrogation of basic human right such as
life and liberty.   Apart from such human rights, a contract
can be anything which is mutually agreed by members of
your group. The laws and duties are based on "rational
calculation of overall utility, 'the greatest good for the
greatest number.'" (Kohlberg, 1976, p.35)

However, above this principle of social contract,
there is a more fundamental, universal and prescriptive
moral principle: tne principle of justice which is the
central theme of the Stage six.   Kohlberg applies exten-
sively Kant's moral philosophy and Rawl's theory of
justice (1971) in the elaboration of his stage six.   The
major features of   Stage six can be summarized as
follows:

(1) Principle of Respect for Personality

Persons are regarded as ends and not means. They are of unconditional values.

(2) Principle of Justice

This principle defines individual justice as "the right of every person to an equal consideration of his claims in every situation, not just those codified into law" (Kohlberg, 1971, p.210)

(3) Universalistic Principle of Role-taking

This principle guides an actor in a dilemma situation to act and play a role in a way that "any rational agent in a similar situation" should do (p.211). It is argued that decisions governed by this principle are universalistic and reversible. According to Kohlberg (1971, p.213),

> "a universalizable decision is a decision acceptable to any man involved in the situation who must play one of the roles affected by the decision, but does not know which role he will play".

The three principles defining the Stage 6 can be said to be content-free, self-chosen, and non-contigent upon any prior agreement or contract. The only assumption is that it applies to all human beings. In other words, in Stage 6 reasoning, all persons are treated as morally equal, and commutative justice is regarded as

reciprocity, contract and trust. Kohlberg argues that this principle of justice satisfies the formalist's requirement that "rational moral judgments must be reversible, consistent and universalizable." (1973b,p.639) In addition, he claims that "no principle other than justice has been shown to meet the formal conception of a universal prescriptive principle." (1971, p.221) and that no other concept of morality is "stronger" and "more positive" than this one.

Since his first work (Kohlberg,1958), Kohlberg has improved his theory and methodology a great deal, Kohlberg (1973) reports that two of his longitudinal subjects retrogress from stage 4 or 5 to stage 2. He argues that, since both of these two subjects eventually reached Stage 5, there should exist an intermediate transitional stage between stages 4 and 5. He calls it Stage $4\frac{1}{2}$ and defines it as "a no -man's land between rejection of conventional morality and the formulation of non-conventional or universal moral principles". (Kohlberg, 1976, p.43). In short, the stage $4\frac{1}{2}$ person views matters from a personal, subjective, arbitrary and outside-of-society perspective.

More recently, Colby et. al. (in press, p.63), in the longitudinal study of Kohlberg's data using Standard Issue Scoring Method, still count the above two stage $4\frac{1}{2}$ cases as a violation of the sequence of Kohlber's six stages.

In addition, each stage can further be subdivided into two substages: A and B. The social perspectives of both substages are the same and they are therefore said to belong to the same stage. On the other hand, "judgments at substage B are more equilibrated and reversible than their A counterparts" (Colby, et. al., 1979(I), p.71). A judgment is said to be reversible if it can be applied equally to any character in a moral situation. In other words,

> "Type A makes judgments more descriptively and predictively, in terms of the given 'out there'. Type B makes judgments more prescriptively, in terms of what ought to be, of what is internally accepted by the self". (Kohlberg, 1976, p.40)

It is thus argued that the substage B is more natural, balanced, internal and universalistic than the substage A.

Kohlberg (1973a,1974,1981) also postulates a "Stage 7" which is beyond Stage 6, with a perspective on life's ultimate meaning. Further details are given in Section 2.4.1.

II. Methodology in Assessing Moral Judgment

Kohlberg uses a set of hypothetical moral dilemmas as a research instrument for testing his theory. The instrument is called Moral Judgment Instrument (MJI) There are three forms of the MJI. A copy of the MJI

Form A is given in Appendix 5(D). The MJI employs a
person to person interview format. However, it is
possible to modify the MJI into a written questionnaire
so that it may be administered to a group of subjects
simultaneously.

The original formulation of the hypothetical moral
dilemmas was done in 1958. Since then, the scoring method
has been improved. The old scoring method is called
the Aspect-Scoring system and the new one the Issue-
Scoring system.

(1) The Aspect-Scoring System

A system of 25 "aspects" grouped into 9 major sets:
"rules, conscience, welfare of others, self's welfare,
sense of duty, role taking, punitive
justice, positive justice, and motives" is the basis for
scoring. (Kohlberg, 1976, p.41; 1969; 1958). Each
statement of a subject's response is scored by using a
list of prototypical sentences on each aspect in each of
the dilemma stories. Another method is to score each
aspect of a subject's total response to a story by a
story rating manual. In other words, the first method is
sentence scoring by aspect and stage, and the second one
is story rating also by aspect and stage. According
to Kohlberg (1976, p.43-44) "the sentence unit had
proven too large for analytic, as opposed to ideal,
typological scoring". This disadvantage of the aspect

scoring system led to a radical change in the scoring method in early 1970s.

(2) Intuitive Issue Scoring

The term 'issue' is defined as "what the individual is valuing, judging or appealing to, rather than his mode of reasoning' (Kohlberg, 1976, p.43). Kohlberg constructs the following list of issues found in every society and culture: (1) Laws and rules (2) Conscience (3) Personal roles of affection (4) Authority (5) Civil rights (6) Contract, trust, and justice in exchange (7) punishment and justice (8) Value of life (9) Property rights and values (10) Truth (11) Sex and sexual love" (Kohlberg 1976, p.43). Each content issue may consist of a number of moral aspects. For example, the issue "laws and rules" involves moral aspects like role taking, duty, fairness, etc. The subject's whole idea about an issue in a story is regarded as a unit for scoring. A list of prototypical arguments for each issue at each stage is given in a scoring manual. This scoring method is called the Intuitive Issue Scoring and "is theoretically the most valid method of scoring, since it is instrument free, that is, applicable to any moral dilemmas". (Kohlberg, 1976, p.45)

(3) Standardized Issue Scoring

Since it is only possible for those thoroughly trained to achieve a high inter-rater reliability of 0.9 or above in Intuitive Issue Scoring, Kohlberg and his

associates have developed a scoring manual for standardized issue scoring (Colby, et al., 1979). For each dilemma, the standard manual focuses on the scoring of two dominant issues. For example, in the story: "Philip (or Heinz) and the drug", the life issue is an issue "pro" stealing while the law issue is one that"con" (against) stealing. Within each issue, a set of values used by the subject is called "norm" or moral norm. Each norm is further differentiated into a set of "elements".

A long list (more than 900 pages) of standardised statements called "Criterion Judgment" appears in the Standard Manual (1979). According to the manual, "criterion judgment represents the intersection of one norm and element as applied to a standard issue on a dilemma construed at a particular moral judgment stage". (Colby, et al 1979 (I), p.47).

In general, the procedures for Standard Issue Scoring consist of: (Colby, et al, 1979 (I-IV);

(1)   To determine which of the two standard issues is the subject's chosen issue.

(2)   Read through all the subject's responses to the dilemma being scored. Differentiate the material in each response according to whether it falls under the chosen issue or the non-chosen issue.

(3)   Make an initial guess of the likely stage of the material by comparing the subject's responses with the global issue stage description.

(4)   Within each chosen issue, separate the material
        according to norm and element.

(5)   Determine the stage of each moral judgment by match-
        ing to criterion judgments in the standard scoring
        manual.

(6)   If clear and marginal matches in step (5) is not
        possible, try to guess the stage from the responses
        obtained.

(7)   Repeat steps (4) to (6) for the non-chosen issue
        in the dilemma.

        Based on the issue scores obtained for each of the
dilemmas, the moral maturity score (MMS) can be calculated.

III. A Critical Discussion

(A) Theoretical Issues

(1) The Structure of Kohlberg's Six Stages

According to Kohlberg (1969, 1971, 1973, 1976), the following assumptions are made on the structure of the six-stage sequence:

(a) Structured wholeness

Following Piaget's conception of stage, Kohlberg postulates that each of his six stages forms a structured whole. This assumption is claimed to be empirically supported in two main aspects:

(i) The internal consistency reliability for the Standard Issue Scoring of Kohlberg's Moral Judgment Instrument is very high. According to Colby et. al (in press, p. 30), is 0.92 for Form A, 0.96 for Form B and 0.94 for Form C. Similarly, the alternate form reliability is also very high. It ranges from 0.82 to 0.95 (p.28).

(ii) Factor analysis of the correlations among stage scores on each of the issues across the dilemmas leads to a conclusion that "moral judgment as measured by the Interview Forms A, B, and C and scored using the Standard Form Scoring Manual, is a single, general domain". (Colby, et. al., in press, p.41)

It seems that the new empirical findings using the Standard Issue Scoring are good enough to clear much of the criticism given by philosophers and psychologists (see e.g. Locke, 1979, p.171-172; Bergling, 1981, p.20). Nevertheless, Rest (in press, p.77-78; 1979b, p.56-63) argues that Kohlberg's Simple Stage Model (See also Section 2.3.1 (IV)) is inadequate for accounting for subject's moral thinking.   He also points out that

> "the consistency of scores in Kohlberg's data is
> not a strong test of stage consistency in a person's
> moral thinking.   Various scoring rules have been
> devised to weed out stage mixture and so the procedure
> is biased towards stage consistency." (Rest,
> in press, p.77)

(b) A Sequence with Cognitive and Moral Adequacy

Kohlberg (1971) claims that there is an inner logical order in the sequence of his six stages.   That is, "a higher moral stage entails a lower moral stage, at least partly, because it involves a higher logical structure entailing a lower logical structure" (p.186). Kohlberg (1973b) also claims that a higher moral stage is more adequate than a lower moral stage according to certain moral criteria.   These claims of cognitive and moral adequacy, particularly the latter one, have been criticized by many philosophers or critics (See e.g. Peters, 1971, 1978; Locke, 1979; Carter, 1980; Flanagan, 1982).   All of them regard Kohlberg's claims of adequacy as unsound or unsatisfactory.

(c) Invariant Developmental Sequence

Kohlberg's assumptions of cognitive and moral adequacy are fundamentally developmental in nature. From a strict empirical point of view, the developmental sequence of Kohlberg's stage structures should be better studied by following subjects longitudinally.

Based on the analysis of his longitudinal data, Kohlberg and his colleagues claim that the six moral stages form an invariant sequence (Kohlberg and Kramer, 1969; Kohlberg, 1976, p.43; Colby et. al., in press, p.41-45).

Apart from the problem of retrogression (See Part (I) of this section), the claim of an invariant developmental sequence appears to be the most promising one. However, since the Standard Issue Scoring has only been recently refined for publication, it may be argued that more researches using the new scoring method are needed in order to offer strong support of this claim. (See also Colby et. al., in press, p.52-56, for a brief review of four longitudinal studies using the Standard Issue Scoring).

(2) The "Truth" of Kohlberg's stages

According to Kohlberg (1976), the criteria for his stages to be "true" are two-fold. The first is that the definition of the stage structure is operational or empirical. The second is that "the conceptual structure of the stages is not contingent on a specific psychological

theory.. They are, rather, matters of adequate logical analysis." (p.47). In other words, "stage structure is not a hypothetical construct from which behavioural 'signs' are deduced; it is an abstraction of structure from an interview which always embeds structure in content." (Colby, et. al., 1979 (I), p.9). However, Trainer (1977) argues that Kohlberg's stages are "imaginative philosophical constructions deriving from sources other than empirical evidence". (p.46). Tomlinson (1979) also expresses his puzzlement about these stage structures. He writes, "using the Kohlberg manual, my students and I have often found ourselves asking: 'are things really so clean?'" (p.340)

Furthermore Kohlberg's theory has been criticised by philosophers such as Peters (1978) and Alston (1971) as inadequate and one-sided. Peters (1978) argues that Kohlberg's system does not deal with the affective aspects of development . (p.150). It accounts neither for the development of positive motivations such as sympathy and consideration for others nor the development of negative ones such as shame and guilt. (p.153) Psychologist Wright (1971) also critises that Kohlberg's stages over-emphasise the structure of moral reasoning and, to a large extent, neglects the importance of moral content in the understanding of moral development. He writes: "it is not unreasonable to suppose that why a person thinks an action wrong is much less important than that he thinks it wrong." (p.173)

Another method of testing the truth of Kohlberg's stages is to examine how good his stages are in the prediction of moral action. Kohlberg (1976) argues that "to act in a morally high way requires a high stage of moral reasoning. One can, however, reason in terms of such principles and not live up to them". (p.32). In addition, he claims that "moral stage is a good predictor of action in various experimental and naturalistic settings". (p.32). On the other hand, Mischel and Mischel (1976) argue that, according to their analysis, they do not justify Kohlberg's above claim. They point out that the "predictive validity from moral reasoning to moral behaviour does not appear to be better than the modest,

albeit often statistically significant, personality co-
efficients (averaging 0.30) typically found in correla-
tional personality research linking measures across
diverse response modes." (p.101) In addition, Kurtines
and Greif (1974), in a review of Kohlberg's theory, conclude:

> "there is no clearly demonstrated connection between
> moral judgment, as measured by the Moral Judgment
> Scale, and moral action. Overall, predictive
> validity is minimal." (p.468).

(3) Cultural Universal Assumption

Kohlberg claims that his six stages are cultural-
universal. That is, the sequence is invariant for all
persons and cultures. He presents cross-cultural data
collected in USA, Taiwan, Mexico, Turkey and Yucatan to
support his claim (Kohlberg, 1969, 1971). In addition,
according to Colby (in press, p.52-56), two cross-
cultural longitudinal studies using the Standard Issue
Scoring also support their cultural universal claim.

On the other hand, Simpson (1974) challenges Kohlberg's
cross-cultural studies. She argues that Kohlberg's
interview employs analytic and theoretical modes of
thought and language such as "justice, equality and
reciprocity at a high level of abstraction" (p.94),
which are not valued by many cultures.

As Lickona (1976b, p.10) points out, Kohlberg can resolve the above problem by asking:

"(1) Can one logically test the universality of moral stages, defined in terms of value categories, without using the same value categories from one culture to another? (2) Can one logically require that all groups everywhere must demonstrate all levels in the moral hierarchy in order to establish its universality....?"

In an extensive review of cross-cultural studies of Kohlberg's stages, Edwards (1981) concludes that the first three moral stages "are found in a wide variety of cultural settings". (p.533) On the other hand, he argues that "the greatest problem arises with respect to Kohlberg's highest stages, which seem to be found much more commonly in complex than in simple societies". (p.523). Similarly, Bergling (1981), in an analysis of 12 cross-cultural studied carried out in 9 countries (p.64) comes to the conclusion that Kohlberg's Stages 1-4 are empirically supported in western industrialized countries but "findings from the Bahamas and British Honduras fail to support even a Stage 4". (p.84)

(4) Uniqueness and Scope of Kohlberg's Theory

(a) Uniqueness

Kohlberg (1976) claims that "anyone who interviewed children about moral dilemmas and who followed them

longitudinally in time would come to our six stages and no others." (p.47) On the other hand, Bull (1969, p.29-35) presents an alternative scheme of moral judgment development with empirical support. In addition, Garbarino and Bronfenbrenner (1976) also postulate a typological theory of socialization of moral judgment with three developmental levels.

(b) Scope

There are two major problems in the scope of Kohlberg's theory:

(i) Philosophical basis of the six stages

Simpson (1974) argues that there are biases in Kohlberg's moral principles which are based solely on western philosophy. She thinks that it is inadequate to explain the concept of morality without reference to non-western philosophies. The present writer agrees with Simpson's point. The elegant Chinese and Indian philosophies of morality have been influencing the behaviour of about one-half of the human population on earth; they should not be neglected. See Section 2.4 for an attempt to apply Chinese Tao Philosophy in the establishment of a basis of the ultimate stage of human development.

(ii) Male-female differences

Gilligan (1977) finds that the female structure of moral thinking is, in some aspects, different from

Kohlberg's structure which is derived mainly from longi-
tudinal study of male subjects.   For example, females
emphasize responsibility more rather than rights and they
are in general more affective and affiliative oriented
than males.   Similarly, Holstein (1976) also argues that
there is some sex bias in Kohlberg's scoring standards.
Flanagan (1982, p.508) regards the male-female differences
as one of the major defects of Kohlberg's theory.

(B) Empirical Issues

In a critique of Kohlberg's theory and measurement,
Kurtines and Greif (1974) argue that (i) the general
meaningfulness of the six intuitively derived moral stages
is not yet clear.   In addition, the administration and
scoring of Kohlberg's measurement has not been standardized.
(ii) The reliability of Kohlberg's test instrument is
not convincing and needs to be demonstrated.   (iii) The
predictive validity from moral reasoning, as measured by
Kohlberg's test, to moral action is minimal (iv) the actual
construct validation for the test is small.

On the other hand, Broughton (1978), in a defence
of Kohlberg's theory, argues that Kurtines and Greif's
"queries turn out to be generated not only by lack of
familiarity with the literature, but also by a broad
misunderstanding of Kohlberg's theory, which derives from
a research paradigm and a conception of science and the
human mind quite at odds with Kohlberg's" (p.81).   He
argues that it is conceptually wrong to regard Kohlberg's

measurement as a projective psychometric scale. Further-
more, "criticisms of Kohlberg's measurement procedure do
not necessarily imply criticisms of Kohlberg's theory.
The theory could be correct, and we (Broughton and his
associates) could still debate the best way to bring a
measure instrument to bear on it." (p.82)

With the new Standard Issue Scoring, many of the
defects of Kohlberg's Moral Judgment Instrument pointed
out by Kurtines and Greif (1974) have been eliminated or
improved. Nevertheless, the following remarks on
the new scoring system should also be considered carefully:

(i)   The scope of the Criterion Judgments is far from
      exhausted. In other words, guessing instead of
      matching is unavoidable in the scoring process
      (particularly in the scoring of cross-cultural data).
      It is doubtful that one can make an exhaustive list
      of all judgments given by subjects of all cultures
      in an open-ended interview on moral reasoning. In
      addition, no criterion judgment is given for stage
      6 in the manual.

(ii) The process of matching the subject's judgment with
      the Criterion Judgment is sophisticated and subjec-
      tive, especially in the case of marginal matching.

(iii) It is obvious that those who understand Kohlberg's
      scheme quite well can always score, according to
      his scheme (say, by Intuitive Issue Scoring), with
      a high inter-rater reliability.

On the other hand, those who do not quite understand Kohlberg's theory and measurement and hope to increase their scoring reliability by sticking closely to the 1000+ page manual would be struggling in vain. In other words, as far as the scoring of Kohlberg's Moral Judgment Scale is concerned, experienced moral psychologists do not need to use the manual, while most inexperienced people may not be capable of using it.

On the whole, the new scoring system should be praised on at least two major aspects:

(i)   It demonstrates how a complex open-ended psychological test instrument can be standardized in a fairly objective and scientific way.

(ii) It offers other moral psychologists a set of operationally well-defined criterion judgment statements which are extremely valuable reference materials for constructing tests of moral and social development.

In short, there is no doubt that the Standard Issue Scoring is a significant contribution to the empirical study of moral judgment development.

An Appraisal of Kohlberg's Contribution

Many psychologists (e.g. Wright, 1971, p.167; Lickona, 1976a, p.240; Tomlinson, 1979, p.354; Hersh, et. al., 1979, p.44-45) regard Kohlberg as an outstanding pioneer in moral development research. Hersh et. al., (1979, p.45) write:

"in a sense, Kohlberg has helped finish Piaget's unfinished work; but in the process, he has greatly expanded and revised Piaget's original findings."

2.3.4   Objective Assessment of Moral Judgment:

Rest's Defining Issues Test (DIT)

1. The Theoretical Background of the DIT

According to Rest (1975a; 1976b, p.76-86), there are two basic methods in the assessment of moral judgment:

(a) A questionnaire or an interview format is prepared and the subject is asked to write or talk about his/her moral thinking in a free-response manner. Subjects may be asked to write essays or to talk on abstract and philosophical topics such as "How do you define morality?" "What are rights and wrongs?" etc. Or subjects may be presented some hypothetical moral dilemmas and are asked to decide what should be done and why. Kohlberg's Moral Judgment Instrument (MJI) is of this type. Another method originally used by Piaget (1932) is to present subjects two stories and ask them to compare the acts of the actors in the stories (See also Section 2.2).

(b) A set of prototypic statements representing the scoring categories is prepared and the subject is asked to choose among them. Such stage prototypic statements may be written in two different ways: (i) The statements represent "arguments or justifications for a course of action". (Rest, 1979b, p.84) For example, in Kohlberg's Heinz Story, statements

can be written to give reasons for
stealing or not stealing the drug. (ii) The state-
ments represent or define the crucial issues in a
moral dilemma. That is, for example,

"What is the most important question a subject thinks
a person should ask himself or herself in making a
decision in the Heinz story? Is the issue whether
Heinz might get caught and sent to jail? Is the issue
whether a loving husband would care so much for his
wife that he'd stoop to do a dastardly deed? Is the
issue how the law and order of a community are going
to be maintained?" (Rest, 1979, p.84)

Obviously, methods (i) and (ii) are closely related.
However, method (i) is a more specific and concrete
way of representing arguments for and against an action
or decision in a moral dilemma while method (ii) is
regarded as a more structural and general way of
representing arguments in making a decision in a moral
dilemma. The DIT employs Method (ii) in its cons-
truction. The basic empirical assumption of the DIT
is that "developmental stages of moral judgment involve
distinctive ways of defining social-moral dilemmas and
of evaluating the crucial issues in them". (Rest,
1979b, p.85) On the other hand, the theoretical basis
of the DIT is Kohlberg's six-stage theory. In short,
Rest's (1975a) general assumptions in the use of pro-
totypic statements in the assessment of moral judgment
consist of (1) Kohlberg's stage characteristics can be
specified (2) Prototypic statements expressing clearly

the stage characteristics can be constructed (3) "Subjects who are advanced enough in their own development can appropriately recognise stage characteristics in statements." (p.91) (4) Subjects can meaningfully rate or rank the statements.

II. The Test Format and Specific Characteristics of the DIT statements

A sample of the DIT is given in Appendix 5(E). In order to illustrate the test procedure and format, let us consider the story I: Heinz and the drug. The subject is first asked to read the dilemma story. Then she/he should make the decision whether Heinz should steal the drug or not. After that, she/he rates the importance of each of the twelve issue-statements. That is, in making the decision on whether Heinz should steal the drug or not, how important are the issue-statements presented? Finally, the subject is asked to rank the four most important issue-statements in order of importance. The scoring process can be done by computers. The original DIT consists of six stories, three of them are based on Kohlberg's Moral Judgment Instrument.

In the writing up of the issue statements, the following points are taken into account: (Rest, 1975a, p. 77-78; Rest, 1976, p.204-205; Rest, 1979b, Chapter 4).

(1) "The underlying stage structure of each issue statement is emphasized so that higher-stage statements appear

stark and abstract and do not lend themselves to being interpreted as fancier ways of stating a lower-stage idea". (Rest, 1976, p.204).

(2) Distractor items which are called meaningless statements are included.

(3) The word length, syntactic and semantic features of the issue sentences at various stages are carefully considered.

(4) In each of the DITs, several items, with different stage orientations, of a stage are set to fit different types of subjects.

III. Methods of Scoring

Four DIT indices are compared in Davison (1979), three of them are constructed by using the subject's ratings and one by rankings. Two of these four indices are elaborated as follows:

(a) P-index

Scores are calculated by the following scoring criterion for any of the Stage 5A, 5B or 6 statements ranked as one of the top four most important statements in a moral dilemma: a score of 4,3,2,1 is given to a statement ranked as first, second, third and fourth most important respectively. The sum of all the scores gained by a subject in a DIT is called the P-score or raw P-score.

Dividing the raw P by the possible maximum P and multi-
plied by 100 gives the percentage P-score.

(b) Simple Sum of Item Responses (SS)

Define   5 = Most Importance Rating to

          1 = Least (i.e. No) Importance Rating, and

          DJK = Average rating of all the Stage k

                statements, where k = 2,3,4,5A,5B,6.

The simple sum of item response is defined as

SS = (DJ5A + DJ5B + DJ6) - (DJ2 + DJ3 + DJ4)

The other two DIT indices are constructed by (i) a
theoretically weighted sum of item responses (TS) and (ii)
an empirically weighted sum of item response (ES), which
is also called Davison 'D' index.   It has been found that
the ES index "provides the most desirable measure of
overall development" (Davison, 1979, p.244).

IV. The Psychometric Properties of the DIT

The following discussion is based on Davison's
article in Rest (1979b, p.223-245) and other DIT studies.

(A) The Internal Structure of the DIT

According to Davison (1979), it has been found that
(i) the DIT stage score variables displays a simplex-like
structure. (ii) the principal component analysis of the

stage score variable correlations produces two factors
with characteristic roots greater than one, and a set of
factor loadings supporting the stage order predicted.
(iii) the results of the metric multidimensional scaling
analysis also support the predicted order of stages.

In short, it is argued that the above findings
support Kohlberg's six-stage sequence, except with a minor
reversal of the Stage 5A and 5B (Davison, 1979, p.232-234).

(B) Reliability and Validity of the DIT

The DIT is a fairly new test instrument, which was
established in 1972. Since then, the reliability and va-
lidity of this test has been studied extensively by Rest
and his associates (Rest, 1975a, 1975b, 1976, 1979b; Rest
et. al., 1974; Rest etl. al., 1978; Davison, 1979). The
major findings consist of:

(1) The test-retest reliabilities for the P and D indices
    are generally in the high 0.70s or 0.80s (Davison,
    1979, p.240). The internal consistency reliabilities
    for the P and D scores are 0.77 and 0.79 respectively
    for the DIT Six-story version (Davison, 1979, p.239).

(2) In a review of a number of longitudinal studies, Rest
    claims that the DIT has high longitudinal validity (Rest,
    1979a, p.6.5; 1979b, Chapter 5). Cross-sectional
    studies indicate that "the correlation of age with DIT

(rate P) was 0.66, and with DIT (rank P) was 0.62"
(rest, 1976, p.215)

(3) The correlations of Kohlberg's measure of moral stage
with the DIT score are around 0.70s for the hetero-
geneous samples and around 0.40s for the homogeneous
samples.   The correlations of the DIT with other
cognitive developmental measures range from 0.10s
to 0.40s.   (Rest, 1979b, 153-154).

(4) The correlations of achievement and IQ-type tests with
DIT score are usually in the range of 0.20s to 0.50s.
(Rest, 1979b, p.146-153).

In short, it is concluded that the DIT is a reliable
test with good construct validity.

V. A Critical Discussion

In an argument against those people who think that
it is too early to attempt an objective assessment of moral
judgment, Rest (1975) replies:

"those who argue that DIT research is premature either
must claim that studies using prorotypic statements
have also been premature or must show why having
subjects rank statements is such a crucial extension
of established precedents" (p.91).

In the following paragraphs, a number of issues on
the DIT research are discussed.

(A) A Comparison of the DIT With Kohlberg's MJI

(1) Methodological advantages of the DIT

As Rest (1975a, p.76) points out, the fundamental weak points of Kohlberg's measurement of moral judgment are: (i) The subjects' responses cannot, strictly speaking, be compared from subject to subject. (ii) There are interviewer and scorer biases. (iii) Subjects' differences in verbal expressiveness may influence stage scores (iv) The interview and the other scoring process is very time consuming. A number of other weak points such as low test-retest and alternate form reliabilities mentioned by Rest (1975a) have been greatly improved with the establishment of the Standard Issue Scoring (See Section 2.3) On the other hand, Rest (1975a, p.77) claims the following methodological advantages of the DIT: (i) The subjects' responses can be compared because of the highly structured test format. (ii) The variance in stage scores due to the subjects' differences in verbal expressiveness can be minimized. (iii) The DIT is scored objectively either by computers or by hand. Hence it saves time and eliminates scorer bias. (iv) Progressive refinement of the test can be done by item analysis.

(2) Differences Between the MJI and DIT

One empirical study by Froming and McColgan (1979) reports that the correlation of Kohlberg's MJI with DIT

score is 0.61. However, if the age variable is partialed out, the correlation falls to 0.31. This implies that (i) the age variable contributes largely to the observed MJI-DIT correlation (ii) the two approaches, MJI and DIT, may measure moral judgment development quite differently.

While both Kohlberg's MJI and Rest's DIT are test instruments constructed within the domain of Cognitive Developmental Approach, they differs in two major aspects:

(i) MJI: Simple Stage Model vs DIT: Complex Stage Model

The basic rationale underlying these two Stge Models has been discussed in Section 2.3.1.

(ii) MJI: Spontaneous Production of Moral Judgments vs
     DIT: Comprehension and Preference of Moral Judgments

The MJI uses an open-ended interview format and attempts to assess spontaneous production of moral judgments, while the DIT uses a close-ended format and attempts to assess recognition, comprehension and prefer-ence of a set of prototypic statements constructed by the test constructor.

The above basic differences leads Kohlberg (1979) to conclude that the MJI (Harvard test) is better than the DIT (Minnesota test)

> "if one wishes to test implications of simple stage
> theory, since the test was constructed and valida-
> ted according to the criterion of the simple stage
> construct. Insofar as one wishes to research the

implications of the general cognitive-developmental theory underlying both tests, there is no reason to claim the Harvard test is better." (p.xi)

In addition, Colby et. al., (in press, p.76) argue that the development of moral judgment as a whole "may be too broad a scope for what Rest calls the "Simple Stage Model"". They also argue that a full developmental account of an individual's moral judgment may require scores of other moral judgment tests such as the DIT in addition to Kohlberg's MJI score.

(B) The Fakability of the DIT

Psychological tests using hypothetical dilemmas are liable to faking responses. In moral psychology, it is common that subjects tend to 'fake good' in their responses. In a fakability study of the DIT, McGeorge (1975) found that subjects did not increase their P score significantly when instructed to 'fake good' but they did decrease their P score significantly when instructed to 'fake bad'.

In another study, Yussen (1976) asked his subjects to respond to the DIT three times, once for each of the social roles of self, average policeman and average philosopher. He found that the average P score in the case of an average philosopher is the highest in all age groups and that in the case of an average policeman is the lowest in the Grade 10, 12 and College groups. Though

the findings are likely to be due to the different type of test instructions and different social perspectives of others, they might well reflect some problems on the fakability of the DIT.

In addition, Mischel and Mischel (1976) also argue that Kohlberg's measurement is not able to distinguish clearly the competence in moral reasoning from performance or preference.   They write:

> "One cannot be sure from the test, for example, whether a "Stage 3" subject who displays a dominant "good boy" orientation does not know more abstract principles which go beyond approval seeking, or whether he may "have" such concepts but prefer not to verbalize them when reasoning about moral dilemmas".
> (Mischel and Mischel, 1976, p.88)

The above criticism might well be applied to Rest's DIT.

(C) Cross-cultural Study of the DIT

There is no mention of cross-cultural study in Rest (1979b). On the other hand, Ma (1980) found that the cross-cultural indices of the DIT P and D scores using English and Hong Kong Chinese samples are fairly low, 0.30s for the F.4 subjects and 0.60s for the F.6 subjects. (For an explanation of the cross-cultural index, see Section 6.6) This may indicate that the DIT may not be appropriate for cross-cultural studies in its present form. One of the main reason may be due to the culturally biased contents of some of the DIT stories ('Student Take-over', 'Webster' and Newspaper') which are

also highly politically oriented.   It is argued that the
present DIT requires a basic modification in contents
before it can be used for proper cross-cultural studies.

An Appraisal of Rest's Contribution

The DIT research has generated a lot of research on
the objective assessment of moral judgment.   Some of them
use the DIT format or DIT methodology. For examples, the
Moral Content Test (Boyce and Jensen, 1978) and the
Environmental Issues Test (Iozzi and Paradise-Maul, 1980)
both use the DIT format directly, and the Ethical Reasoning
Inventory (Bode and Page, 1980) employs similar DIT
methodology. It is likely that more objective tests of
moral and social development will be constructed under the
influence of the DIT research.

Rest's outstanding work can indeed be regarded as
a milestone contribution to the empirical study of moral
development.

2.4 Stage 7: The Ultimate Stage of Human Development

For convenience and consistency with the system of no-
tation used in Chapter 3, Stage 7 is defined as the
Ultimate Stage of Human Development encompassing all
aspects of human development, for example, moral, social,
cognitive, personality and psychosexual development.
Stage 7 represents a unique stage at which the individual
fuses himself/herself with Nature as a whole and thus
transcends all things, whether emotion, cognition, desires
or morality into one harmonious integrated whole. This
does not mean that people who are young or at a lower
stage of development do not act as integrated wholes. It
simply means that these people are not able to 'comply
with Nature naturally' and therefore do not act as a
harmonious integrated whole.

Since stage 7 is assumed to be the ultimate stage
of all aspects of human development, it is possible, and
more economical and more theoretically elegant to investi-
gate all the aspects as a whole, rather than separate them
into different categroies, that is stage 7 morality,
stage 7 cognition, stage 7 social development etc. It is
only at the initial and final stages of human development
that we can explore in this way without causing logical
and theoretical inconsistency or problems.

In section 2.4.1, some of the explorations beyond
the Moral Stage 6 are briefly mentioned. The focus of this
section is an attempt to investigate Stage 7 in terms of

Tao philosophy which is then described in Section 2.4.2.

2.4.1. Towards Stage 7

I.A.H. Maslow: Self-actualization, B-cognition, Meta-
               motivation and Transcendence.

Maslow's theory (1968, 1971) of self-actualization, B-cognition and Meta-motivation will be used in the next Chapter as a basis for Stage 6, one stage below the Ultimate Stage. In addition, part of Maslow's theory of Transcendence (1971, Chapter 21) can well be regarded as something beyond Stage 6. (For example, paragraphs or points 1, 2, 3, 4, 8, 9, 10, 25, 26, 27, 28 in Maslow, 1971, Chapter 21) As constantly mentioned by Maslow himself, a substantial part of his theory can be regarded as Taoistic. Nevertheless, Maslow's theory of Transcendence is not a completely Stage 7 one. For example, he distinguishes two types of self-actualizing people: transcending and non-transcending ones (1971, p.283). He argues that, "For the transcenders, peak experiences and plateau experiences become the most important things in their lives, the high spots, the validators of life, the most precious aspect of life". (1971, p.283). This can only be Stage 6 because a completely transcended (Stage 7) person treats everything and opinions as equally good and important so long as they are natural, or comply with Nature. (see Section 2.42)

Maslow (1971) elaborates the concept of transcen-
dence by 35 features (p.281-292) and ends up with the
following definition:

> "Transcendence refers to
> the very highest and most
> inclusive or holistic levels
> of human consciousness,
> behaving and relating,
> as ends rather than as means,
> to oneself to significant
> others, to human beings in
> general, to other species,
> to nature and to the cosmos."
> (p.292)

Further details of Maslow's theory of Transcendence
will not be entered into, instead, the elaboration of the
whole, in terms of Tao philosophy will be dealt with in
Section 2.4.2.

II. L. Kohlberg: Ultimate Faith

In the discussion of moral development and faith,
Kohlberg (1974) mentions a stage beyond his Stage 6 and
he calls it Stage 7 (p.14). According to Kohlberg, the
essential of Stage 7 "is the sense of being a part of the
whole of life and the adoption of cosmic, as opposed to
a universal humanistic '(Stage 6)' perspective" (p.15).
The main difference between Stage 6 and Stage 7 is that
the former one has a finite perspective while the latter
one has an infinite and cosmic perspective (p.15). Such
infinite or cosmic perspective is necessary in the
resolution of, for example, the despair of facing death.
For further details of Kohlberg's Stage 7, see Kohlberg,
1981, p.344-372.

In addition, Erikson's (1963) psycho-social Stage 8: Ego Integrity vs Despair and Gilligan's (1976) concept of love relationships also touch some aspects which can be ragarded as at or beyond Stage 6 in our system.

2.4.2. Tao Philosophy as a Basis of Stage 7

In the following paragraphs, we attempt to explore a theoretical base for Stage 7 in terms of Tao Philosophy. A general background of Chinese Philosophy, especially Tao Philosophy is assumed. (for general introduction of Chinese Philosophy, see e.g. Fung, 1948, 1952, 1953; Lin, 1949; Chai and Chai, 1975; Suzuki, 1914; Creel, 1929. For Tao Philosophy, see e.g. Fung, 1933; Ch'en, 1977; Lin, 1958; Creel, 1970).

Tao Philosophy is fundamentally simplistic naturalism (se e.g. Ch'en, 1977, p.34; *Chang, 1958, p.14-15) and there are two main characters in Tao Philosophy:

---

1. Books written in Chinese are indicated by "*", e.g. *Chang, 1958.

2. The following formats of quotation are used for quoting paragraphs from books by Lao Tzu and Chuang Tzu.

   (i) Lao Tzu (or Chuang Tzu) said, "..." (/Name of Translator etc., *i) (i=1, 2, 3, ... etc.)

   (ii) "..." (Lao Tzu or chuang Tzu/Name of Translator, *i) The original Chinese quotations and their sources are given in Appendix 2.4. and follows the numbering system *i.

3. The translation of Lao Tzu: Tao Teh King (or Tao Te Ching) is difficult. According to *Wong (1979, p.551), more than 100 versions in English translation have bee published. For all the quotations from Lao Tzu, two versions in English translation are given - one in the main text, the other in Appendix 2.4. The one by A.J. Bahm (1958) is a free translation. He interprets Tao as Nature and Teh as intelligence. The other by D.C.Lau (1963) is a direct translation.

Lao Tzu and Chuang Tzu. According to Lin (1949, p.23 and P. 66),Lao Tzu was most probably born about 570 B.C. and Chuang Tzu fourth century B.C.. The discussion of Tao Philosophy in this section will be restricted to these two philosophers.

In the following discussion, the author attempts to elaborate and interpret freely Lao Tzu and Chuang Tzu's philosophy from a developmental psychological point of view. The interpretation is exploratory and subjective; it may distort the original meaning of Lao Tzu and Chuang Tzu's view. Some other ways of interpretation of Tao Philosophy can be found in the references given above.

Features of Stage 7: Tao Philosophy

I. Great Intelligence

According to Lao Tzu, two types of intelligence and wisdom can be identified: (i) Common intelligence and general wisdom, and (ii) Great Intelligence and Ultimate Wisdom. Lao Tzu condemns common intelligence because it often misleads us and makes life complicated and sophisticated.

Lao Tzu Said,

> "When cleverness emerges, there
> is great hypocrisy"
> (Lau, 1963, p.74, *1)

and   "If we ignore intricate
learning and knowledge
of petty distinctions,
we shall be many times
better off."
(/Bahm, 1958, p.25, *2)

On the other hand, Lao Tzu praises Great intelligence,
Ultimate and true wisdom - Intelligence that helps us to
understand and comply with Nature; Intelligence that helps
us to lead a simple, tranquil, natural and absolutely free
life.

'Great intelligent' people tend to understand
everything in a simple and perhaps metaphysical way without
the motive to disturb others and with the least dependence
of external environment. Lao Tzu describes these great
intelligent people in this way:

"Without going out-of-doors,
one can know all he needs
to know.

Without even looking out
of his window, one can
grasp the nature of
everything.

Without going beyond his
own nature, one can achieve
ultimate wisdom.

Therefore the intelligent
man knows all he needs to
know without going away,

And sees all he needs to
see without looking elsewhere,
And does all he needs to do
without undue exertion."
(/Bahm, 1958, p.46, *3)

In other words, great intelligent people are self-
dependent, self-fulfilling and self-validating.

Another elaboration of great intelligent people can be found by looking at Lao Tzu's categorization of different types of rulers or leaders. He writes,

> "The most intelligent leaders
> bring about results without
> making those controlled
> realize that they are being
> influenced. The less intel-
> ligent seek to motivate
> others by appeals to loyalty,
> honor, self-interest, and
> flattery. Those still less
> intelligent employ fear by
> making their followers think
> they will not receive their
> rewards. The worst try to
> force others to improve by
> condemning their conduct."
> (/Bahm, 1958, p.24, *4)

Taoistic way of ruling gives ordinary people the highest degree of freedom and causes them the least disturbance. It rules in a way as though the government were not existing yet everyone in the society behaves themselves.

Modern civilization of science and technology cannot be regarded as Great intelligence or Ultimate wisdom because it damages our peace and life as much as it benefits us. Religious and philosophical thought such as Buddhism can be regarded as true and ultimate wisdom and Buddha is certainly a Great Intelligent person. In other words, Tao Philosophy condemns the progress of civilization along the complex, artificial/non-natural, conquering/aggressive, and materialistic-oriented direction. It emphasizes on civilization towards

simplicity and naturalness, that is, civilization that helps us to be in accord with Nature or to fuse with Nature as a whole.

II. Few Desires

As mentioned before, Maslow argues that self-actualizing people tend to have additional needs and motivations. He calls these needs and motivations the metaneeds and metamotivations. Self-actualizing people tend to gratify both the basic and growth or metaneeds. However, this stage of metaneeds and metamotivation is not the ultimate stage of development. Beyond this stage, the person would have a "quantum drop" of needs and desires. He/she would now have one desire only: to live happily and freely with as few desires as possible. The supreme and ultimate stage of development is to transcend oneself so that one becomes desireless mentally. In short, one develops from few desires in infancy (or initial stage) to lots of desires in the stage of metamotivations, and finally transcends from lots of desires to very few desires again. Thus, the ultimate stage resembles the initial stage in many way except with a new perspective and life experience.

The less one desires, the easier one achieve the psychological state of harmony. Lau Tzu said,

"If nothing appears to arouse
envy, one will remain satis-
fied with things as they are."
(/Bahm, 1958, p.13, *5)

"Excessive devotion to chasing
about and pursuing things
agitates the mind with insane
excitement. Greed for riches
ensnares one's efforts to
pursue his healthier motives."
(/Bahm, 1958, p.19, *6)

In other words, if one can transcend the overwhelming
and greedy desires for lots of social and materialistic
rewards into a minimal number of necessary needs, one
would be able to achieve a peaceful and tranquil state
of mind easily.

III. Non-valuative Judgment

While children cannot distinguish clearly right
from wrong, Great Intelligent people do not classify
things into right and wrong ones. In general, they
accept and treat everything, every opinion and every
habituation in their own rights or in their natural
states as equally good and right. In other words, they
interact with others and environment in a non-valuative
way. Chuang Tzu elaborates,

"If a man sleeps in a damp
place, he gets lumbago and
dies. But how about an
eel? And living up in a
tree is precarious and
trying to the nerves. But
how about monkeys? Of the

> man, the eel, and the monkey,
> whose habitat is the right
> one, absolutely? Human
> beings feed on flesh, deer
> on grass, centipedes on
> little snakes, owls and
> crows on mice. Of these
> four, whose is the right
> taste, absolutely? ...
> In my opinion, the doctrines
> of humanity and justice and
> the paths of right and wrong
> are so confused that it is
> impossible to know their
> contentions."
> (/Lin, 1949, p.80-81, *7)

The argument is that all kinds of rational values and judgments are problematic, sophisticated, biased, subjective and confusing, and hence non-natural. The ultimate criterion governing our behaviour, whether it is moral or non-moral, is our unconscious emotion (see also Section 2.5) and not the rational values. It is argued that the unconscious emotion is the least conditioned or affected by external environment and therefore is always in its most accord with Nature. That is to say, so long as the behaviour is natural or complies with Nature, it is totally acceptable and equally good or right. Following this argument, one may say that death is not worse than life; ugliness is not worse than beauty; loss is not worse than gain; bad luck is not worse than good luck; etc. Thus, "Let it be" and "Take it easy", one will be much more peaceful and tranquiller.

IV. Simple Human Relationships.

Tao Philosophy emphasizes on simple human relationships and denies complex social interaction. The Taoistic

living should be simple, quiet and tranquil. This in some sense can easily be achieved in small intimate society. Lao Tzu writes,

> "The ideal state is a small intimate community where all the necessities of life are present in abundance.
>
> There everyone is satisfied to live and die without looking around for greener pastures.
>
> Even if they have cars or boats, they do not use them for travelling abroad.
>
> Even if they have police and fortifications, these are never put to use.
>
> Business transactions are simple enough to be calculated on one's fingers rather than requiring complicated bookkeeping.
>
> The people are satisfied with their food,
> Contented with their clothing,
> Comfortable in their dwellings,
> Even though neighboring communities are within sight,
> And the crowing of the neighbor's cocks and barking of the neighbor's dogs are within hearing,
> They grow old and die without ever troubling themselves to go outside of their own communities."
> (/Bahm, 1958, p.68-69, *8)

The Human relationships and social interaction in large and highly civilized societies are complicated and sophisticated. People are constrained by a complex system of social norms to behave in some prescribed ways. They are not free to act as themselves. In contrary, they often have to act in the way what other people think what

they should act. This very often damages one's naturalness, personal liberty and self-actualizing tendency. Lao Tzu suggests a method mentioned above to resolve this problem. However, it may be quite difficult to lead a taoistic life in a modern society which emphasizes on materialistic and social rewards. Some further research is necessary to interpret Tao philosophy in modern sense.

V. Natural Characters

As mentioned in III, one of the main themes in Tao Philosophy is naturalness and complete acceptance of everything in its original and natural state. Thus, Taoistic characters are natural characters. Fung (1933) elaborates, "Everything has its own Te, or virtue. Everything has its own proper nature. Everything is happy, if it is allowed to be in accordance with its own nature".(p.8) It is argued that sophisticated or unnatural characters which do not comply with Nature often give people painful suffering. Chuang Tzu said,

> "For duck's legs though
> short, cannot be lengthened
> without dismay to the duck,
> and a crane's legs, though
> long, cannot be shortened
> without misery to the
> crane. That which is long
> in nature must not be cut
> off, and that which is
> short in nature must not
> be lengthened. Thus will
> all sorrow be avoided."
> (/Lin, 1949, p.105, *9)

We breifly mention below three of the natural characters described in Tao Philosophy.

(1) Child-hearted Character

Nothing is more natural than those exhibited by a small child or nursing infant. Except not being intelligent, the heart of a child is true, natural and beautiful. Lao Tzu said,

> "He who is intelligent is
> like a little child."
> (/Bahm, 1958, p.51, *10)

Similar description of this kind of child-hearted or natural character can also be found in Maslow (1970, p.157-159) or Section 2.1.2.

(2) Softness

According to Lao Tzu, softness and weakness imply living; hardness and toughness mean death. He said,

> "At birth, a man is soft
> and weak - yet capable
> of living the whole life
> ahead of him.
> At death, he is hard and
> tough - yet unable to
> live for even a minute
> longer.
> All things, whether plants
> or animals, while living,
> are soft and weak,
> But, when dead, are hard
> and tough.
> Thus hardness and toughness
> are allied with death,
> While softness and weakness

are interrelated with life".
(/Bahm, 1958, p.65, *11)

People at the Ultimate Stage of Development are those who tend to cause least disturbance or harm to others. To be strong, to win or to conquer is certainly one of the most harmful things one can do to others. In addition, the softer we are, the easier we would be able to get adapted in different environments and hence the easier we could comply with Nature. However, one may query that if we are soft and weak, is it likely that we would be easily conquered or destroyed by others, by environment or by Nature? The answer is negative, for the soft and weak in Lao Tzu's sense overcomes the strong. Lao Tzu argues,

> "Nothing is weaker than water;
> Yet, for attacking what is
> hard and tough,
> Nothing surpasses it,
> nothing equals it.
> The principle, that what is
> weak overcomes what is strong,
> And what is yielding conquers
> what is resistant,
> Is known to everyone.
> Yet few men utilize it
> profitably in practice."
> (/Bahm, 1958, p.66-67, *12)

In other words, the soft and the weak in Lao Tzu's sense is the fittest for survival. Those who try to be strong, tough or aggressive are in contrary easily to be injured or destroyed.

(3) Tranquillity

People with few desires tend to have a tranquil character. Tranquillity implies peace, harmony and least disturbance. Lao Tzu said,

> "Being without avarice through
> being tranquil,
> The world will be consolidated
> of its own accord."
> (/Ch'en, 1977, p.186, *13)

Tranquillity means self-sufficiency and non-agitative; it does not mean inactive and stagnant. According to Ch'en's (1977) interpretation, tranquillity means "waiting patiently for the course of natural development to bring the problem and the solution to light without initiating elaborate measures to deal with a non-existent difficulty". (p.29) That is to say, people with a tranquil character only act when everything is ready and prepared.

VI. Complete Transcendence

The ultimate stage of development is a stage of complete transcendence in which one entirely forgets oneself, completely transcends oneself or fuses oneself with Nature to form one whole. At this stage, one becomes absolutely free - free to self-actualize oneself, free to do whatever one likes to do; free from illness, temptations, greedy desires, social pressures, despair of facing death, psychological dependance of others etc.

Chuang Tzu calls these people the perfect men, the divine man, the true Sages, the great supreme or simply the true men. Chuang Tzu elaborates the characteristics of these true men as follows:

"The true men of old did not
override the weak, did not
attain their ends by brute
strength, and did not gather
around them counsellors.
Thus, failing they had no
cause for regret; succeeding,
no cause for self-satisfaction."
(/Lin, 1949, p.96, *14)

"The true men of old did
not know what it was to love
life or to hate death.
They did not rejoice in
birth, nor strive to put
off dissolution. Unconcerned
they came and unconcerned
they went. That was all."
(/Lin, 1949, p.96, *15)

"Such men are free in mind
and calm in demeanour, with
high foreheads. Sometimes
disconsolate like autum,
and sometimes warm like
spring, their joys and
sorrows are in direct touch
with the four seasons, in
harmony with all creation,
and none know the limit
thereof."
(/Lin, 1949, p.96, *16)

"The true men of old appeared
of towering stature and
yet could not topple down.
They behaved as though want-
ing in themselves, but
without looking up to others.
Naturally independent of
mind, they were not severe.
Living in unconstrained
freedom, yet they did not
try to show off....."
(/Lin, 1949, p.97, *17)

Chuang Tzu also said,

"... thus it is said, "The
perfect man ignores self;
the divine man ignores
achievement; the true sage
ignores reputation."
(/Lin, 1949, p.72, *18)

It is concluded that in order to be absolutely free
and to transcend oneself completely, one should have great
intelligence, few desires, a non-valuative life philosophy
and leads a simple and tranquil life.

The introduction of Tao Philosophy as a basis of the
Ultimate Stage of Human Development (Labelled as Stage 7)
is primitive and limited in scope in the above brief
discussion. The main objective here is to initiate an
exploration of oriental thought in the study of moral
development. It is hoped that future study on introducing
Indian Philosophy, Buddhism and Western Philosophy as
bases of Stage 7 will be carried out soon.

It should be emphasized that though the above
discussion of Tao Philosophy is believed to form a part of
the universal structure of Stage 7, it does not, however,
cover the all possible forms (structures) of Stage 7. It
is likely that a more complete description of Stage 7 can
only be constructed by exploring and integrating a number
of major philosophies, Eastern and Western.

2.5. Moral Judgment and Decision: A Cybernetic Approach

Pugh (1977) develops a value-driven decision model of the Human Decision System. His theory is rooted in Sociobiology, Cybernetics and Decision Science. According to Pugh, the function of a value-driven decision system is similar to that of a human brain. "It compares alternative courses of action and selects one that seems 'best' in terms of a built-in system of values." (Pugh, 1977, p.6; see also Appendix 2.5(A), No.1).

The main purpose of this section is to sketch out the Moral Judgment and Decision System (MJDS) as a value-driven decision system. The basic concepts come from Pugh (1977). Since Pugh's classification of the built-in values is similar to Maslow's Hierarchy of Basic Needs, the structure of the built-in values in the following model is based on Maslow's Hierarchy (see Sectio 2.1) rather than Pugh's classification. For a review of Pugh's book (1977), see Marley (1978).

In general, the input and output processes of the MJDS are described in terms of Boradbent's model (1958, 1971). The Central Judgment and Decision Process is based on Pugh (1977) and Rest (in press). The model can be called the Cybernetic Approach of Moral Judgment and Decision.

2.5.1 Basic Concepts of a Value-Driven Decision System

A basic assumption in Cybernetic is that "biological systems operate within the same laws of information theory and system design that apply to artificial systems". (Pugh, 1977, p.35) Artificial systems refer in general to any computerized decision systems. The designer of a machine is man and the design objective is to use the machine to carry out some specific tasks for us. Similarly, Pugh argues that the designer of biological decision systems is biological evolution and the evolutionary design objective is the survival of the species.

There are two fundamental concepts in the Value-Driven Decision Model:

(1) Limited Capacity of Finite Decision Systems and Innate Human Values

"All biological decision systems and all computerized decision systems are finite data-processing systems. They have limited capacity for data input, data storage, and data analysis." (Pugh, 1977, p.26) However, the external environment can be very complex and "may involve almost unlimited variability." (p.27) For a finite system of limited capacity to deal with an environment of infinite variability, it is unavoidable to introduce compromises in its design. Based on the evolutionary design objective (Survival of the Species), a set of quite complex and

variable innate human values is incorporated to biological
decision systems as a design compromise. The innate
human value structure "is not an ideal or perfect appro-
ximation to the evolutionary objective. It is simply
the best compromise the evolutionary process has been
able to produce" (p.31). These innate values can be regar-
ded as substitutes or "surrogates for the ultimate evolu-
tionary objective".(p.34) They are sometimes called
Primary or 'Instinctive' Values.

Some major features of Primary Values are:

(a) The primary values are the biological decision system's
"ultimate criteria for evaluating decisions" (Pugh,
1977, p.7). They are the major determinants of human
behaviour.

(b) These values are "simply inherited decision criteria
that were built into the human species during the pro-
cess of evolution".(p.29) They are part of the built-
in system hardware.

(c) They include emotions, biological drives and valuative
sensations, such as "tactile pleasure or pain, comfort
or discomfort, joy or sorrow, and good or bad taste".
(p.30)

(d) They change with time and circumstances in accordance
with some complex, built-in nonrational rules. For
example, "the hunger sensation is an innate response
to a deficiency in nourishment, pain is an innate

response to dangerous heat or physical pressure...."
(p.31)

In addition to primary values, human behaviour is
also influenced by a set of secondary values, which are
based on primary values. Some major features of Secondary
Values are:

(a) They are learned as a result of interaction with the
    environment. In other words, they are·"developed
    individually and culturally as an outgrowth of more
    basic innate human values:" (p.29).

(b) They are developed as a practical aid to problem-
    solving, they tend to simplify the decision-making
    process and hence "help the decision system to make
    decisions more efficiently or more reliably".(p.33)

(c) The secondary values "can take the form of rules of
    thumb, wise proverbs, social conventions, moral or
    ethical principles, and even habit." (p.33)

(d) They are usually developed as a result of rational
    thinking.

Further details concerning the Primary and Secondary
Values are given in Appendix 2.5(A), No.2.

(2) The World Model

The World Model is a conceptual representation of
the external world in a biological decision system. The

innate values are incorporated as a natural part of the world model through the model-building and refinement process. "The 'models' may be as unsophisticated as a child's model of his mother, which he uses to predict her response, or as sophisticated as quantum mechanics or general relativity." (Pugh, 1977, p.104-105) In the judgment and decision process, the model is used to "identify possible courses of action and to predict the consequences of the possible action alternatives". (p.105)

In general, the secondary values refer to some general moral principles or guidelines while the World Model is a conceptual representation for the environment. The World Model includes certain refined details of the environment and is based on the organism's primary and sometimes secondary values. For example, when we interact with our parents, we use a conceptual model of them, rather than a set of secondary values regarding parents-son/daughter interaction. That is, we know what they like and dislike, and that they love and care us. In other words, we can predict fairly accurately their reaction when we interact with them. On the other hand, when we interact with a stranger in a certain special situation, we always start with our secondary values as a guiding principle. It is obvious that the use of secondary values in decision-making requires more cybernetic resources than the use of the World Model unless some major model refinements are necessary, because in the former case, the system has to construct a model of the environment based on his/her secondary (and primary)

values, while in the latter case, the model has been constructed and is being stored in the Memory System.

2.5.2. The Moral Judgment and Decision System (MJDS)
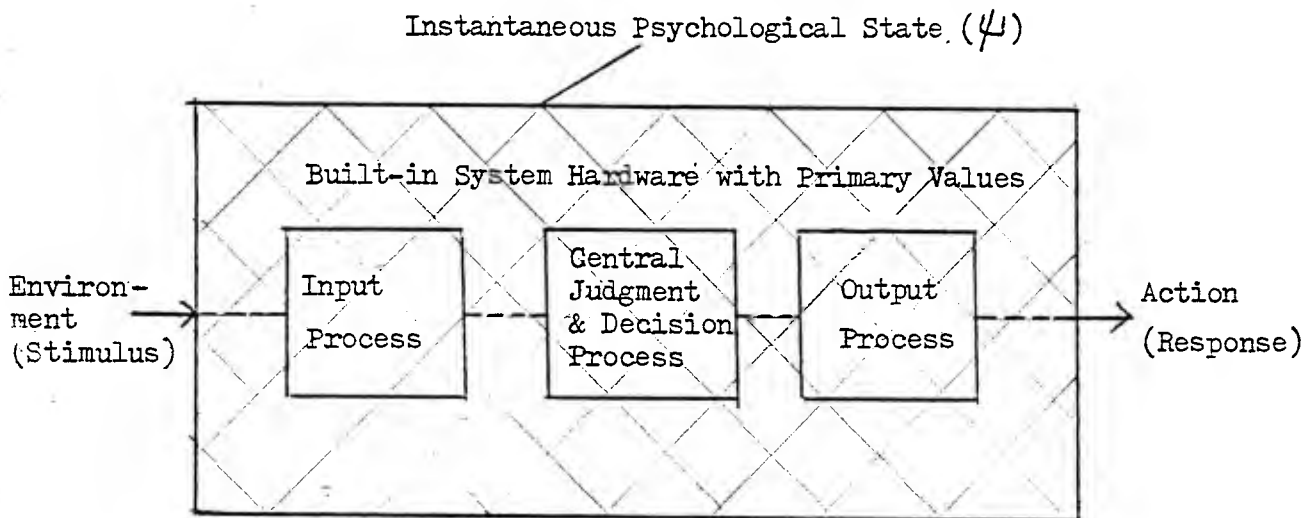
(A) A Block Structure of the MJDS.

Figure 2.3. Moral Judgment & Descision System (MJDS):
A Block Diagram

The MJDS presented here is a hypothetical model based on current studies in Decision Science, and Pugh's Value-driven decision model. It should be emphasized that the model is a heuristic one which has not strong empirical support and many of the refined details are not known.

There are two basic characteristics affecting the
functions of the MJDS:

(1) Built-in System Hardware

The built-in system hardware is incorporated with a
set of primary values as a result of biological evolution.
The hardware is represented in Fig.2.3 by a net of black
lines showing that the whole process leading to moral
action is affected by the structure of this built-in sys-
tem hardware. In general, the system hardware of the
MJDS refers to the inborn biological structure of the
human brain and the nervous system. It determines the
basic characteristics and functions of the MJDS. On the
other hand, the proper and full function of the "built-in"
or "genetically determined" system hardware is not com-
pletely inborn, it depends to a large extent on one's
normal psychological development. (Pugh, 1977, p.103-104)
In general, members of a species possess very similar or
exactly the same structure of the built-in system hardware.

(2) Instantaneous Physiological and Psychological State

Physiological and psychological state (ψ) refers to
the state of basic needs and general condition of the
organism. The classification of basic needs follows that
of Maslow's Hierarchy of Basic Needs. (Maslow, 1970 (1954)).
Instantaneous state is the state of the organism when the

input stimulus is being processed by the MJDS to give action. In other words, whether the organism is in healthy condition; in emoted state;or satisfied with food and water etc. during its functioning will affect its outcome.

In the last section, the state of basic needs is related to the primary values described by Pugh (1977), therefore ψ is also dependent on the primary values. According to Pugh (1977, p.71-78), the primary values of an organism is time dependent, thus ψ is also changing with time. In general, ψ takes the form of a periodic function of time. For example, the need for food drops to a very low level after taking a meal and rises to a high level just before the time of next meal.

(B) The Basic Functions of MJDS

Broadbent (1958, 1971) attempts to analyse "human function in terms of the flow of information within the organism." (1971, p.7) He starts with the concept of information in telephone and radio engineering and formulates a model based on "laboratory studies of simple functions such as the ability to detect a faint light occurring at unexpected times, or to remember a telephone number." (1971, p.3) Since his model is derived from empirical evidence, it lays a strong scientific foundation for further development. The input and output processes of our MJDS is based on Broadbent's model. (For a brief

outline of Broadbent's Information Flow Model, see
Appendix 2.5(B)).

There are many models concerning the Central Judgment
and Decision Process (See e.g., Kaplan and Schwartz (1975,
1977), Hogarth (1980)). The basis of the present model
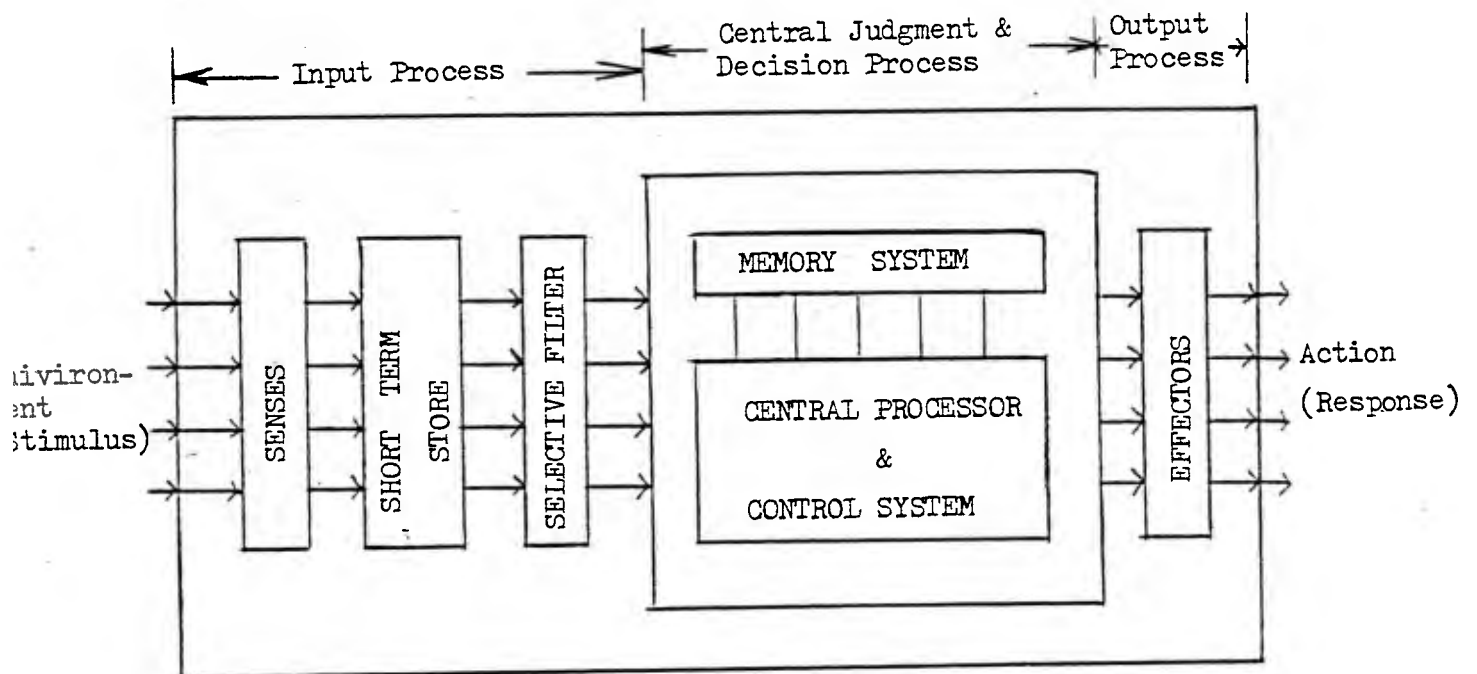comes from Rest (*in press*) and Pugh (1977).

Figure 2.4. The Basic Structure of MJDS

The basic functions of the MJDS can be divided into
three major parts:

I. Input Process.

Our senses act as the receptor of incoming data.
Part of these data will be stored in a buffer or temporary
store so that any excess incoming information not imme-
diately processed by the Central processor can be held for

a time not longer than a second. Because of the limited
capacity of the system, it is necessary for it to focus
its attention on some specific incoming information and
to ignore all the others. The selection of incoming
information is done by the Selective filter based on some
built-in rules.

II. Central Judgment and Decision Process

The Central Judgment and Decision Process (CJDP) is
carried out by the Control System and Central Processor,
which are incorporated with a Memory System. In Broadbent's
Model, the Memory System is called the Store of Conditional
probabilities of Past Events, while the Central Processor
and Control System are represented by his "Limited Capacity
Channel" and "System for Varying Output Until Some Input
is Selected" (Broadbent, 1971, p.10). The functions of
the Control System include:

(i) "allocating the cybernetic resources of the system",

(ii) assigning "tasks to be accomplished by other components",
and

(iii) controlling "the flow of information between compo-
nents". (Pugh, 1977, p.144) The Central Processor
refers to the main parts of the Human Brain which processes
the operation. Further details concerning the nature, and
biological and mechanical functions of the Central Proces-
sor and Control System in human brain can be found in
chapter 6 of Pugh (1977).

There are many theoretical models in Decision Science which describe the strategy in decision-making. We attempt to illustrate some aspects of the Central Judgment and Decision Process by introducing a model proposed by Rest (in press) which concerns mainly the process of moral judgment and decision. The details of the researches cited in the following discussion will not be mentioned here. Many of them have been discussed in Chapters 1 and 2. Further reviews of these researches can also be found in Rest (in press) and Staub (1978, 1979).

The Central Judgment and Decision Process consists of:

(1) Interpreting the Stimulus and Identifying the Problem

The incoming information passing through the Selective filter are interpreted by the organism. The interpretation may "include inferring the intentions, values, and needs of the people involved in the situation; the probable direction of their activities; and the effect of their activities on each other's welfare." (Rest, (in press) p.7). Researches on Bystander Reactions to Emergencies (Darley and Latane, 1968) and Empathy and Distress (Hoffman, 1975, 1976, 1979) are related to this process. A moral problem can only be raised if the actor realizes that "something he does would affect the welfare of someone else," (Rest, in press, p.7). In this aspect, research on Social Cognition (See, e.g., Damon, 1978; Selman, 1976) is relevant.

(2) Formulating an Ideal Plan of Moral Action

After the moral problem has been identified and
structured, the next step is usually to formulate an ideal
plan of action which satisfies one's moral ideals, or
secondary values or World Model. Some researches in
social psychology attempt to investigate how the social
norms affect the formulation of a plan of moral action
(See, e.g., Rest, in press, p.20-21). On the other hand,
cognitive developmentalists are more interested in the
study of the structures of moral judgment which act as a
basis for an individual to formulate a plan of action.

(3) Evaluating Alternatives and Making Decision

Parallel to Step (2), the actor will identify and
evaluate all possible alternatives. It is quite common
that the first possible action an individual thinks of
is not a moral one or an ideal one. The evaluation of
alternatives normally includes the assessment of the con-
sequences of each alternative action and the uncertainties
involved in it. Very often, people choose not to act
according to their ideal plan of moral action. It may
be due to one or more of the following factors: one's
primary values and instantaneous psychological state, the
nature of the action, and one's secondary values.
Relevant researches include: (a) Decision-making models
(see e.g., reviews by Rapoport and Wallstan, 1972; Kaplan

and Schwartz, 1975, 1977; Hogarth, 1980) (b) The origin
of Values: Sociobiological view (Wilson, 1975; Pugh, 1977;
Cognitive Developmental view (Piaget, 1932; Kohlberg,
1969, 1971, 1976) and Socialization view (Durkheim, 1925).

The last (i.e. the fourth) component of Rest's
model: 'executing and implementing a moral plan' is incor-
porated as a part of the Output Process.

III. Output Process

According to Broadbent (1971, p.10), the output
action is implemented by a set of effectors. It is obvious
that the effect of the initial output action will be fed
back into the organism in order to modify its further
action. The reasons why people very often cannot imple-
ment a moral plan successfully is quite complicated;
researches on ego strength, delay of gratification and
self-regulation (See, e.g., Mischel and Mischel, 1976)
are relevant.

Apart from the emphasises on the formulation of an
ideal plan of moral action, the main themes of Rest's
model are similar to those of other decision-making models
(See, e.g., Pugh, 1977, p.102-107: Hogarth, 1980, Chapter
8). Obviously, the model is not a linear one. Rest
(in press) writes:

"Although the four components
have a logical order (inter-
pretation, then formulation
of a moral course of action,
then decision, then execution
and implementation), the
framework is not presented
as a linear decision-making
model, because there is ample
evidence of interaction among
the components...." (p.38)

A detailed bibliography and more details of the above cybernetic model is given in Rest (in press), Pugh (1977) and Broadbent (1971).

3. A Theoretical Model of Moral Development

3.1. Introduction

The model describes the fundamental nature of moral development and behaviour. It is postulated that moral development and behaviour depends on the following fundamental parameters:

(1) Psychological Needs (N)

The physiological and psychological needs (N) form an underlying fundamental factor which affects all human behaviour. It is hypothesized that the development of N forms a major component of moral development. In this aspect, the theoretical base is predominantly Humanistic Psychology. (See literature review in Section 2.1)

(2) Human Relationships (R)

When two persons A and B interact with each other, the moral decision and action of A in any event depends largely on the relationship between A and B.

The above simple idea will be elaborated in more refined details in a later section. This approach can be called "common-sense" approach or "naive" approach. (See literature review in Section 2.2)

(3) Structure of Moral Judgment (J)

The development of moral judgment or reasoning is another fundamental factor of moral development. The cognitive developmental theory of morality established by Piaget and Kohlberg provides basic ideas for the theoretical model. (See literature review in Section 2.3)

The exposition of the theory is given mainly in mathematical terms.

3.2. Psychological Needs: A Humanistic Approach.

In this section, Maslow's Theory of Human Motivation (See Section 2.1) is extended to include the Needs for fusion with Nature (see Section 2.4.2(VI)) It is postulated that Maslow's Hierarchy of Basic Needs and the Need for fusion with Nature form a single hierarchy as follows:

N_1 = Physiological Needs

N_2 = Safety Needs

N_3 = Belongingness and love needs

N_4 = Need for esteem from other people

N_5 = Non-transcending Self-actualization needs

N_6 = Transcending self-actualization needs

N_7 = Need for fusion with Nature

A Hierarchy of Psychological Needs

An important assumption in Maslow's theory can be put in this way:

If N_1, N_2 ...., N_{i-1}, N_i are "relatively well gratified",
then N_{i+1} emerges. (3.2-1)

Consider two examples:

(i) If the physiological needs (N_1) are relatively
well gratified, then safety needs (N_2) emerge.
(Maslow, 1970, p.39).

(ii)"If both the physiological (N_1) the the safety
(N_2) needs are fairly well gratified, there will
emerge the love and affection and belongingness
needs (N_3)...." (p.43, the notations N_1, N_2
and N_3 are ours)

Consider a person of age $= T_k$ years, the general
state of psychological needs of the person is given by

$$N = \sum_{i=1}^{7} \alpha_{ik} N_i \qquad (3.2-2a)$$

where α_{ik} = psychological coefficient defining the
degree of gratification or satis-
faction of N_i by the person of age =
T_k years.

Without loss of generality, the range of α_is are
defined as:

$$0 \leq \alpha_{ik} \leq 1 \quad \text{for any k} \qquad (3.2-2b)$$
$$\text{and } 1 \leq i \leq 7$$

where α_{ik} = 0 means completely deficient of N_i needs
α_{ik} = 1 means completely gratified of N_i needs.

It is assumed that α_{ik} is time-dependent, that is $\alpha_{ik} = \alpha_{ik}(t)$ where the value of t is often small. It is of course always possible to express t in terms of the age variable T_k but since for some i, t may be very small - as small as 1 or 2 days or even a few hours, it is more convenient to refer t to a fixed frame of reference set by the observer. Consider, e.g., i = 1, in general, $\alpha_{ik}(t)$ becomes a large value when t = time just after a meal and a small value when t = time just before a proper meal. In this case, $\alpha_{ik}(t)$ may be said to be a certain periodic function of t.

There are three types of gratification coefficients.

(1) $\alpha_{ik}(t)$ = Instantaneous value of the coefficient of gratification of N_i needs of a person of age T_k years at a time t in a frame of reference set by an observer.

(2) $\alpha_{ik} = \overline{\alpha}_{ik}$ = Average value of $\alpha_{ik}(t)$ over a sufficiently large time t_0, which is equal to one period of time in case $\alpha_{ik}(t)$ is a periodic function.

(As an illustration, assume $\alpha_{ik}(t)$ is an integrable function for $0 \leqslant t \leqslant t_0$, then

$$\alpha_{ik} = \overline{\alpha}_{ik} = \int_0^{t_0} \alpha_{ik}(t)dt/t_c.$$

(3) α_{ik}^0 = Threshold value of α_{ik}. It is the minimum average value above which N_i can be regarded as "relatively well gratified."

It is postulated that:

(i) If $\alpha_{ik} \geqslant \alpha_{ik}^o$ for $n \geqslant i \geqslant 1$

then $\alpha_{n+1\,k} \geqslant 0$ (3.2.3)

(ii) $\alpha_{ik}^o \geqslant \alpha_{i+1\,k}^o$ for $6 \geqslant i \geqslant 1$

(i.e., $\alpha_{ik}^o \geqslant \alpha_{2k}^o \geqslant \alpha_{3k}^o \geqslant \cdots \geqslant \alpha_{6k}^o \geqslant \alpha_{7k}^o$)

(3.2.4)

(In order to **be** consistent, the age variable T_k should be defined as the _mean_ age over a sufficiently large time t.)

In addition, α_{ik} possesses two other basic characteristics:

(a) For the majority of people, as i increases beyond three, α_{ik}^o decreases very rapidly to zero.

(b) In general, the values of α_{ik}^o are different for different individuals. The smaller the i is, the smaller the differences of the values of α_{ik}^o are among different individuals.

Equation (3.24) is consistent with Maslow's argument that "a more realistic description of the hierarchy would be in terms of decreasing percentages of satisfaction as we go up the hierarchy of prepotency" (Maslow, 1970, p.54). According to Maslow, the emergence of a new need "is not a sudden, saltatory phenomenon, but rather a gradual emergence by slow degrees from nothingness." (p.54) In the

following figure, we try to sketch out the concept of emergence of a new need. The figure also serves to illustrate the development of N.

Figure 3.1 A Developmnetal Pattern of Psychological Needs(N)
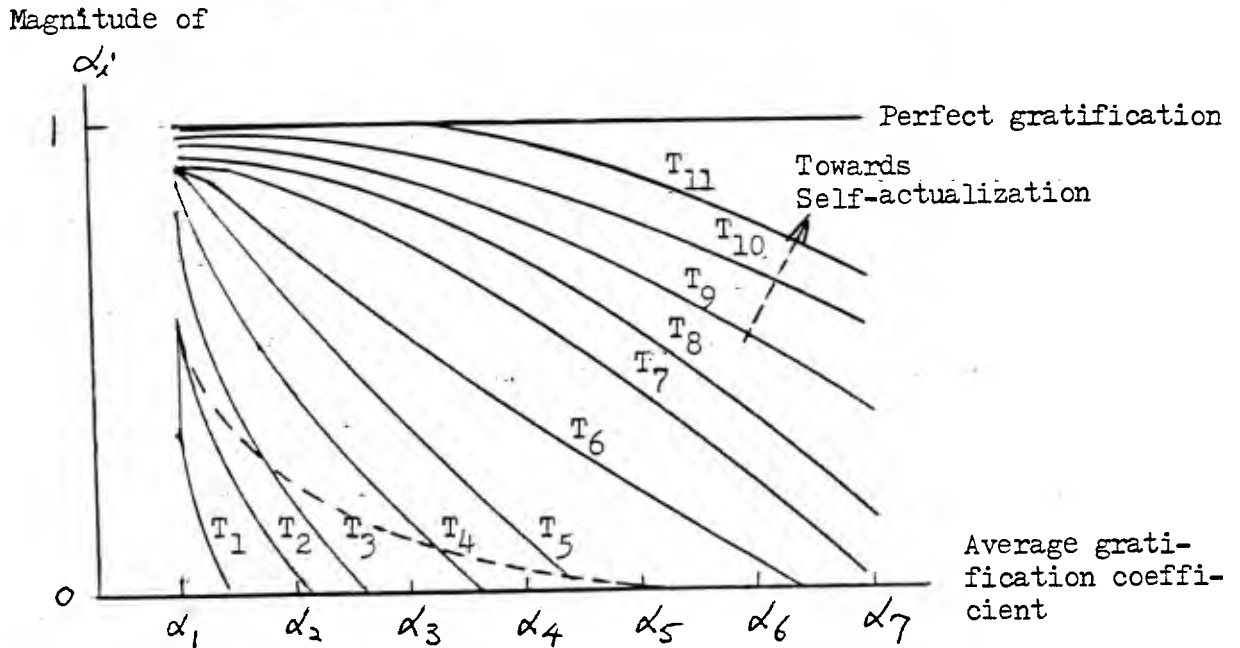
Notes:
(1) The dotted line indicates a curve of Threshold values of $\alpha_i's$.
(2) $T_1 < T_2 < T_3 < T_4$ etc.

The above figure is an illustration only. Each solid curve represents a possible and stable developmental pattern at age = T_k years. The dotted curve represents the threshold values of $\alpha_i s$.

Mathematically, the general feature of the development of N can be expressed as follows:

$$N = N(T_k) = \sum_{i=1}^{7} \alpha_{ik} N_i \qquad\qquad (3.2\text{-}5a)$$

With $0 \leq \alpha_{ik} \leq 1$ for any k and $1 \leq i \leq 7$

and

$$\alpha_{ik} \geqslant \alpha_{i+1k} \quad \text{for} \quad 1 \leq i \leq 6 \qquad (3.2\text{-}5b)$$

For $T_{k+1} > T_k$, it is postulated that

(i) $\alpha_{ik+1} \geqslant \alpha_{ik} \quad \text{for} \quad 7 \geqslant i \geqslant 1 \qquad (3.2\text{-}5c)$

(ii) $\alpha_{1n} \geqslant \alpha_{1n}^{o} \quad \text{for any age} = T_n \qquad (3.2\text{-}5d)$

(iii) and in general

either (a) $\alpha_{ik} \geqslant \alpha_{ik}^{o} \quad (\text{for } 7 \geqslant i \geqslant 2)$

$$(3.2\text{-}5e)$$

or (b) there exists a number n such that

$$\alpha_{ik} \geqslant \alpha_{ik}^{o} \quad \text{for} \quad 1 \leq i \leq n$$

$$(3.2\text{-}5f)$$

and

$$\alpha_{ik} < \alpha_{ik}^{o} \quad \text{for} \quad 7 \geqslant i \geqslant n$$

with $\alpha_{nk} \gg \alpha_{n+1k} \gg \alpha_{n+2k} \gg \alpha_{n+3k} \ldots$ etc.

(In other words, for that part of the curve underneath the dotted curve, the α_{ik}s decrease rapidly as i increases).

Though (3.2-5)(a to f) describes a general pattern of the development of N, in theory, for most people; it does not exclude other possible stable patterns. Three possible patterns not obeying (3.2-5) are illustrated as follows.

Magnitude of
α_i'
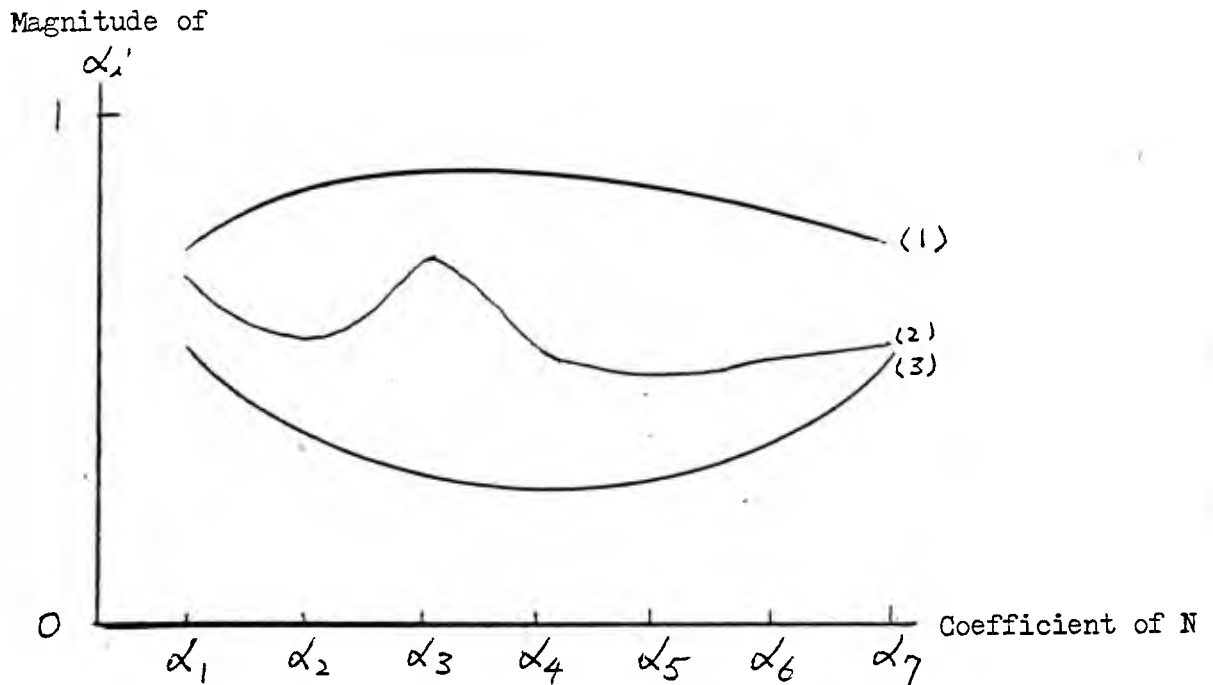
Figure 3.2 Some Special Patterns of N

3.3.   Human Relationships : A Naive Approach

Human interaction is defined as the total interaction
between an actor and his/her environment, which may consist
of other people, living things (e.g., a cat or a tree)
and non-living things (e.g., a block of wood or a diamond
ring). For simplicity and without loss of generality,
the discussion is focussed on the interaction between an
actor and other people, that is, social interaction.
When an actor (A) interacts with another person (P) in a
social situation, one major factor affecting A's course
of action is the relationship between A and P. This rela-
tionship forms part of the World Model in the MJDS of
the actor. (See Section 2.5) In Pugh's (1977) terms,

the World Model of P conceptualized or constructed by A
determines A's action. Since the World Model is dependent
on the secondary and basically primary values, the Human
Relationship also bears a direct relation with the second-
ary values (i.e. levels of moral judgment, J_i and coeffi-
cients γ_i) and primary values (i.e. Psychological Needs,
N_i and coefficients α_is) Common Statements such as "Blood
is thicker than water" (Kinship); "Your scratch my back
and I'll scratch yours" (Reciprocal altruism or Social
Exchange); "Mind your own business" (Stranger-Stranger
interaction) etc. are relevant.

The relationship between an actor, A and a person, P
is defined as the importance of P valued by A in an inter-
action. The assignment of the values of importance by A
to different people is often emotional, rather than rational.
It is argued that the assignment of these values of import-
ance has a genetic or biological origin (See Section 2.2).
One method to express the values of importance or Human
Relationship is to use the concept of altruism in psychology.
Since there is no universally accepted definition of al-
truism in psychology, the common one provided by Bar-Tal
(1976) based on the work of Berkowitz (1972) and Krebs
(1970) is adopted here: "altruistic behaviour 1. Must be
carried out voluntarily 2. Must aim to benefit another
3. Must be carried out without expectation of a reward."
(Bar-Tal, 1976, p.5) (See also Appendix 2.2(A)).

Based on consensus of opinions (See also Carter, 1980), the following hierarchy of Human Relationship is therefore constructed:

$(R_0 = \text{Self})$

R_1 = First kins; close relatives

R_2 = Best friends/intimates

R_3 = Neighbours, peer group, colleagues (e.g., club, political party, company or organization, school)

R_4 = People of your country

R_5 = People of other countries

R_6 = Someone you dislike or enemies

R_7 = Other living things (e.g. animals and plants) and non-living things.

A Hierarchy of Human Relationships

A few remarks about the above hierarchy are:

(1)   Based on the assumption that "Human life is more important than the life of any other things", the "other living things and non-living things" are grouped into R_7, which is put at the bottom of the hierarchy.

(2)   The hierarchy is a general one, which exists in most rational people.

(3)   Each R_i represents a domain of interaction for the actor. In general, the whole domain of interaction

of an actor $= \sum_{i=1}^{7} R_i = R_0 + R_1 + \text{---} + R_7 = R_D$

(4)   The above division of the whole domain of interaction of an actor is arbitrary but the order of the hierarchy: Kins - friends - strangers - enemies - other living things - non-living things is invariant of the methods of division. It should be noted that the position of R_0 = self in the hierarchy is not defined at this stage. It will be discussed in further details in Section 3.3.5.

(5) For each R_i, it is always possible to subdivide it into a sub-hierarchy. For example: for R_1, we may sub-divide it into:

R_{11} = parents; sons/daughters; husband/wife

R_{12} = brothers/sisters

R_{13} = first cousins.

--------------- etc.

However, the rationale underlying such sub-division is quite complex, and since the main interest is to establish the fundamental nature of Human Relationship, the refined sub-division of R_is is left for possible future research.

(6) R_1 R_2 R_3 R_4 R_5 R_6 R_7

Value of
importance: Greatest ⟵——— increase ⟵——— Smallest

Mathematically, Human Relationship is expressed as:

$$R = \sum_{i=1}^{7} \beta_i R_i \qquad (3.3\text{-}1)$$

Where $0 \leq \beta_i \leq 1$ (for $i = 1, 2, \text{---}, 6, 7$)

β_i = coefficient of Human Relationship between an actor (A)

and a member of R_i, (P)

As mentioned before, it is possible to define the values of importance of others given by an actor in terms of the concept of altruism, therefore β_i is defined as the importance of a member of R_i (P) as valued by an actor (A) or the probability of carrying out altruistic act towards P by A.   Hence

$\beta_i = 1$ implies that maximum altruism or minimum selfishness will be executed by A towards P.

$\beta_i = 0$ implies that minimum altruism or maximum selfishness will be executed by A towards P.

In general

$\beta_1 \geqslant \beta_2 \ldots \geqslant \beta_7$

or

$\beta_i \geqslant \beta_j$ for $1 \leq i \leq j$ $\qquad (3.3\text{-}2)$

Degree of
altruism
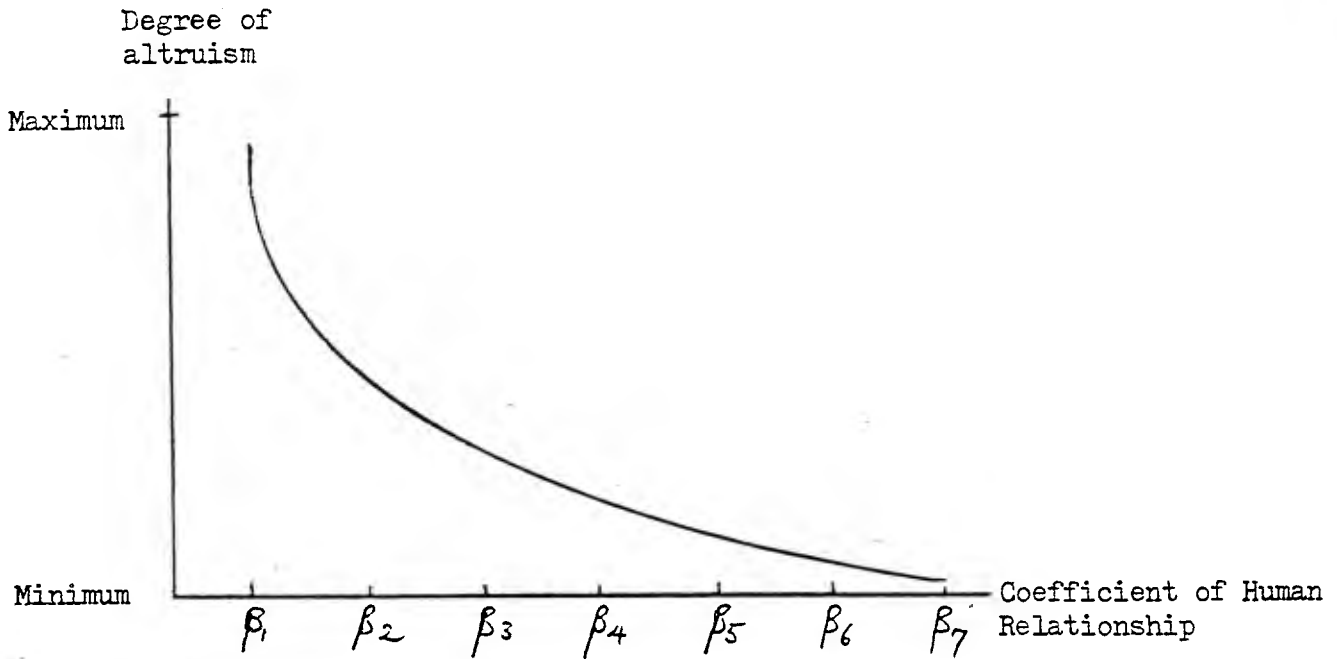
Figure 3.3 Altruism and Human Relationship

Theoretically speaking, (3.3-2) means that if P
belongs to any R_i (i = 1,2,3, --- 7), and the same or
equivalent social situations occur between the actor (A)
and P, then the probability of carrying out an altruistic
act by A towards P obeys $\beta_i \geqslant \beta_j$ for i < j. While the
meaning of "the same and equivalent social situations"
is theoretically acceptable, it may be difficult to define
it in empirical studies, and individual researchers may
have to construct specific operational definitions for
their own purposes.

Basically, the developmental pattern of β_i is postu-
lated to be similar to that of α_i. The ultimate goal
of development of R is to be altruistic to all others in
the world; that is to develop universal love and friend-
ship.

Mathematically, the development of R can be expressed as follows:

Consider a person of age $= T_k$,

$$R = R(T_k) = \sum_{i=1}^{7} \beta_{ik} R_i \quad \text{where } \beta_{ik} = \text{Coefficient of Human Relationships at age } T_k.$$

By (3.3-2),

$$\beta_{ik} \geqslant \beta_{i+1 \ k} \quad \text{for} \quad 6 \geqslant i \geqslant 1$$

(This is same as: $\beta_{ik} \geqslant _{jk}$ for $1 < i < j$)

At age $T_{k+1} > T_k$,

$$R = R(T_{k+1}) = \sum_{i=1}^{7} \beta_{ik+1} R_i$$

and $\beta_{ik+1} \geqslant \beta_{i+1 \ k+1}$ for $6 \geqslant i \geqslant 1$

Now, it is postulated that

$$\beta_{ik+1} = h_i \beta_{ik}$$

$$(3.3-3)$$

with $h_i \geqslant 1$ for $i = 1,2,---7$

(or $\beta_{ik+1} \geqslant \beta_{ik}$ for $1 \leq i \leq 7$)

It should be noted that the derivation of (3.3-3) is similar to that of (3.2-7).
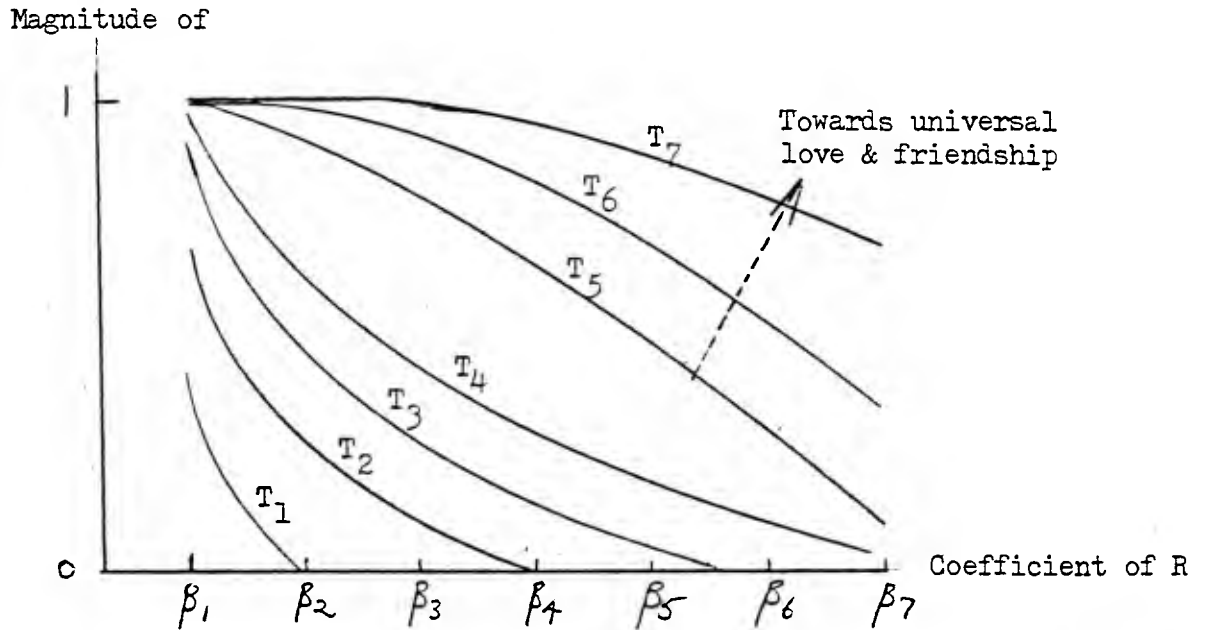
Figure 3.4. A Developmental Pattern of Human Relationship (R)

Excluding R_7, the ultimate goal of the development of Human Relationship: to be altruistic to all others is also consistent with the human ultimate evolutionary objective: survival of species because altruism, on the whole, favours group and species survival. (See Section 2.2). The theme underlying altruism towards members of R_7 is philosophical, religious and idealistic. It will not be elaborated here. (See also Section 2.4.2)

5.4. Moral Judgment: A Cognitive Developmental Approach

The structure of moral judgment is another major determinant of moral behaviour. Kohlberg's six-stage theory of moral development (See Section 2.3) and the Stage 7 described in Section 2.4 are combined to form a single theoretical hierarchy.

J_0 = Stage 0 : Premoral Stage

J_1 = Stage 1 : "Heteronomous Morality"

J_2 = Stage 2 : "Individualism, Instrumental Purpose and Exchange"

J_3 = Stage 3 : "Mutual Interpersonal Expectations, Relationships, and Interpersonal Conformity"

J_4 = Stage 4 : "Social System and Conscience"

J_5 = Stage 5 : "Social Contract or Utility and Individual Rights"

J_6 = Stage 6 : "Universal Ethical Principles"

J_7 = Stage 7 : Transhuman perspective

A Hierarchy of Moral Judgment

(For J_1 to J_6, see Kohlberg (1976, 1971, 1969))

The stage of Moral Judgment of a person is given by:

$$J = \sum_{i=0}^{7} \gamma_i J_i \qquad (3.4-1)$$

Where $0 \leqslant \gamma_i \leqslant 1$ and γ_i = coefficient of moral judgment

As mentioned before, the stage of moral judgment of a person is seldom a pure and clear-cut one, therefore it is necessary to introduce a complex stage model in the following discussion (See also Section 2.3.1) In general, the γ_i expresses the percentage of the use of J_i, or the probability of using J_i by a person in his moral judgment or reasoning.

The study of the development of J has been well established by Piaget, Kohlberg, Rest and many others (See Section 2.3). The following figure is an illustration of the probabilistic model of J-development. (Not in proportion)
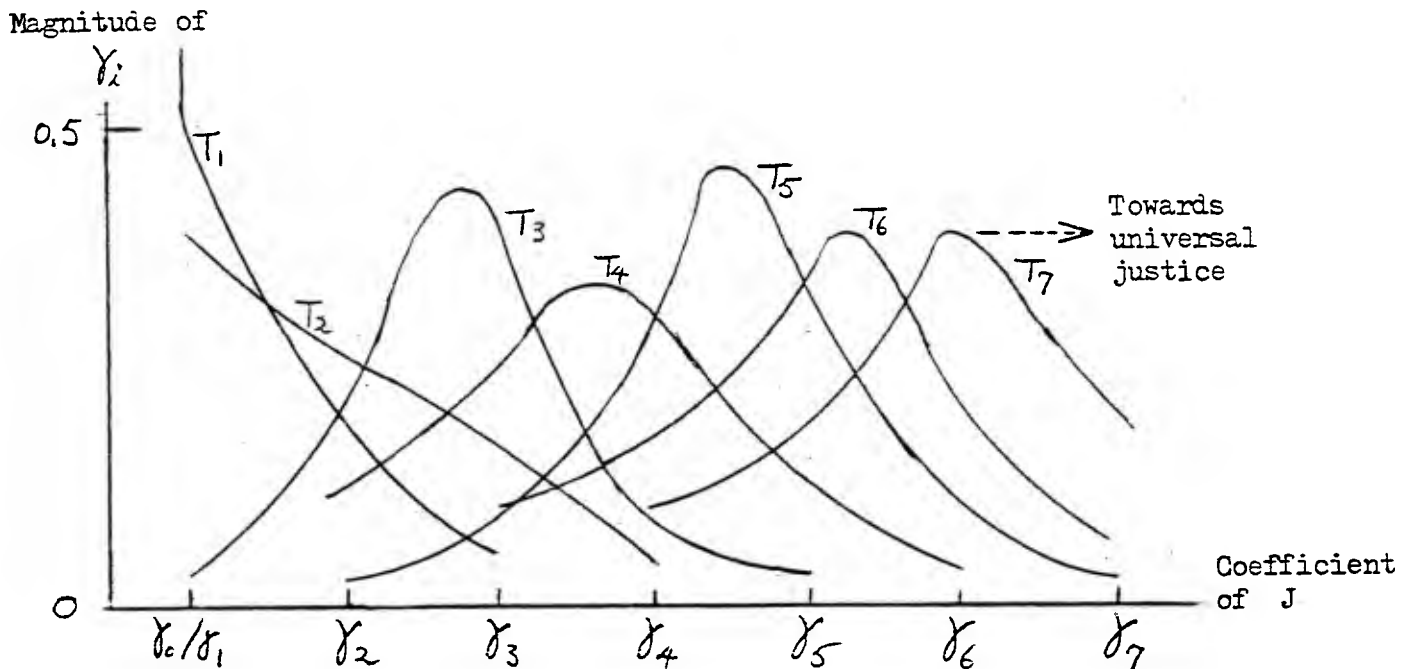
Figure 3.5 A Developmental Pattern of Structure of Judgment (J)

Mathematically, the probablistic Model of J-development can be expressed as follows:

Consider an actor of age $= T_k$

$$J = J(T_k) = \sum_{i=0}^{7} \gamma_{ik} J_i \qquad (3.4\text{-}2a)$$

where $\gamma_{ik} =$ coefficient of Moral Judgment at age T_k.

γ_{ik} obeys the following two conditions:

(i) $\displaystyle\sum_{i=0}^{7} \gamma_{ik} = 1$ $\qquad\qquad (3.4\text{-}2b)$

(ii) $\gamma_i \leq \gamma_{i+1}$ for $0 \leq i \leq m$

$\qquad\qquad\qquad\qquad\qquad\qquad (3.4\text{-}2c)$

and $\gamma_i \geq \gamma_{i+1}$ for $i > m \geq 7$

COndition (ii) implies:

$$\gamma_0 \leq \gamma_1 \leq \text{---} \leq \gamma_{m+1}$$

and

$$\gamma_{m+1} \geq \gamma_{m+2} \geq \text{---} \geq \gamma_7$$

That is,

$$\gamma_{m+1} = \text{Maximum of } \{\gamma_0, \gamma_1, \text{---}, \gamma_6, \gamma_7\}$$

At age $T_{k+1} > T_k$

$$J = J(T_{k+1}) = \sum_{i=0}^{7} \gamma_{ik+1} J_i \qquad (3.4\text{-}3a)$$

With $\displaystyle\sum_{i=0}^{7} \gamma_{ik+1} = 1$ $\qquad\qquad (3.4\text{-}3b)$

and

$$\gamma_{ik+1} < \gamma_{i+1\ k+1} \quad \text{for } 0 \leqslant i \leqslant n$$

$$(3.4-3c)$$

$$\gamma_{ik+1} \geqslant \gamma_{i+1k+1} \quad \text{for } i > n \geqslant 7$$

In general, $n \geqslant m$. $\qquad (3.4-4a)$

and it is postulated that *(without loss of generality, assume the curves T_k, T_{k+1} intersect at γ_{m+1})*

$$\gamma_{i\ k+1} = \dot{a}_i \gamma_{ik} \quad \text{for } a_i \leqslant 1 \qquad (3.4-4b)$$
$$\text{and } 0 \leqslant i \leqslant (m+1) .$$

(or $\gamma_{i\ k+1} \leqslant \gamma_{ik}$ for $0 \leqslant i \leqslant (m+1)$)

and

$$\gamma_{i\ k+1} = b_i \gamma_{ik} \quad \text{for } b_i \geqslant 1 \qquad (3.4-4c)$$
$$\text{and } i > (m+1) > 7$$

The values of a_i and b_i (i=0 1,2,---7) may vary to a large extent among different individuals. More refined empirical studies are required in order to develop the theoretical relations underlying a_is and b_is.

It has been found that the correlation between moral judgment and moral action is not very high (See Section 2.3). Indeed, a person tends to reason about a moral issue or a dilemma situation at a much higher level when he/she is not directly involved in the particular situation. It is postulated that there are two levels of moral judgment in an individual:

J' = Optimal Level of moral judgment

J = Ordinary Level of moral judgment

J' refers to the maximum level of moral judgment achieved by a person of age (T). It is often used by the person to reason about hypothetical moral issues or social situations, particularly those third-personal and less emotional ones. The moral stages studied by most cognitive developmentalists are obviously J's. On the other hand, J is used by a person to reason and make decisions for actions in real-life situations. The relation between J and J' is given by the following equations.

Consider a person of age $= T_k$,

$$J = J(T_k) = \sum_{i=0}^{7} \gamma_{ik} J_i$$

with

(i) $\gamma_i \leq \gamma_{i+1}$ for $0 \leq i \leq m$

(ii) $\gamma_i \geq \gamma_{i+1}$ for $i \geq m \geq 7$

and

$$J' = J'(T_k) = \sum_{i=0}^{7} \gamma'_{ik} J_i \quad \text{with}$$

(i) $\gamma'_{ik} = C_i \gamma_{ik}$ where $C_i \leq 1$ and $0 \leq i \leq (m+1)$

    (or $\gamma'_{ik} \leq \gamma_{ik}$ for $0 \leq i \leq (m+1)$)

(ii) $\gamma'_{ik} = d_i \gamma_{ik}$ where $d_i \geq 1$ and $i > (m+1) \geq 7$

    (or $\gamma'_{ik} \geq \gamma_{ik}$ for $i > (m+1) \geq 7$)

Further discussion on the differences between J
and J' will be found in the next chapter.

3.5. Fundamental Nature of Moral Development

The basic postulates underlying the fundamental
nature of Moral Development have been discussed in pre-
vious paragraphs. Thye are summarized as follows:

Postulate 1 : Primary Postulates of Moral Development

(A) The Development of Psychological Needs

$$\text{If } \vec{N}_k = N(T_k) = \sum_{i=1}^{7} \alpha_i(T_k) N_i$$

$$= \sum_{i=1}^{7} \alpha_{ik} N_i \qquad (3.5\text{-}1a)$$

then (i) $0 \leq \alpha_{ik} \leq 1$ for any k $\qquad (3.5\text{-}1b)$

and $1 \leq i \leq 7$

(ii) $\alpha_{ik} \geq \alpha_{i+1\ k}$ for $1 \leq i \leq 6$ $\qquad (3.5\text{-}1c)$

(iii) For $T_{k+1} > T_k$,

$\alpha_{i\ k+1} = a_i\ \alpha_{ik}$ with $a_i \geq 1$ $\qquad (3.5\text{-}1d)$

(or $\alpha_{ik+1} \geq \alpha_{ik}$)

(B) The Development of Human Relationships

If $\vec{R}_k = R(T_k) = \sum\limits_{i=1}^{7} \beta_i(T_k) R_i = \sum\limits_{i=1}^{7} \beta_{ik} R_i$ (3.5-2a)

then

    (i) $0 \leq \beta_{ik} \leq 1$ for any k and $1 \leq i \leq 7$ (3.5-2b)

    (ii) $\beta_{ik} \geq \beta_{i+1\ k}$ for $1 \leq i \leq 6$ (3.5-2c)

    (iii) For $T_{k+1} > T_k$, $\beta_{i\ k+1} = b_i \beta_{ik}$ (3.5-2d)

with $b_i \geq 1$ and $1 \leq i \leq 7$

(or $\beta_{i\ k+1} \geq \beta_{ik}$)

(C) The Development of Moral Judgment

If $\vec{J}_k = J(T_k) = \sum\limits_{i=0}^{7} \gamma_{ik} J_i$ (3.5-3a)

then

    (i) $\sum\limits_{i=0}^{7} \gamma_{ik} = 1$ (3.5-3b)

    (ii) There exists (at least) a number m such that

    $\gamma_{ik} \leq \gamma_{i+1\ k}$ for $0 \leq i \leq m$ (3.5-3c)

and $\gamma_{ik} \geq \gamma_{i+1\ k}$ for $i > m \geq 7$

    (iii) For $T_{k+1} > T_k$ *(without loss of generality, assume the curves T_k, T_{k+1} intersect at γ_{m+1})*

    $\gamma_{i\ k+1} = C_i \gamma_{ik}$ (or $\gamma_{i\ k+1} \leq \gamma_{ik}$) for

        $C_i \leq 1$ and $0 \leq i \leq (m+1)$ (3.5-3d)

and

$$\gamma_{i\ k+1} = d_i\ \gamma_{ik}\ (\text{or}\ \gamma_{i\ k+1} \geqslant \gamma_{ik})\ \text{for}$$

$$d_i \geq 1 \quad \text{and}\quad i > (m+1) \geq 7 \qquad (3.5\text{-}3\text{d})$$

(D) Define

$$\vec{M}_k = M(T_k) = \text{The Stage of Moral Development}$$
$$(\text{or in general Human Development})$$
$$\text{of a person of age, } T_k.$$

$$\vec{M}_k = \vec{N}_k + \vec{R}_k + \vec{J}_k \qquad (3.5\text{-}4)$$

For convenience, the matrix representation is used.

Let

$$\{\alpha_{jk}\} = (\alpha_{1k}\ \alpha_{2k}\ \alpha_{3k}\ \text{-}\ \text{-}\ \text{-}\ \alpha_{7k})$$

$$\{\beta_{jk}\} = (\beta_{1k}\ \beta_{2k}\ \beta_{3k}\ \text{-}\ \text{-}\ \text{-}\ \beta_{7k})$$

$$\{\gamma_{jk}\} = (\gamma_{0k}\ \gamma_{1k}\ \gamma_{2k}\ \text{-}\ \text{-}\ \text{-}\ \gamma_{7k})$$

$$\vec{n} = \begin{pmatrix} N_1 \\ N_2 \\ \cdot \\ \cdot \\ \cdot \\ N_7 \end{pmatrix} \quad \vec{r} = \begin{pmatrix} R_1 \\ R_2 \\ \cdot \\ \cdot \\ \cdot \\ R_7 \end{pmatrix} \quad \vec{j} = \begin{pmatrix} J_0 \\ J_1 \\ \cdot \\ \cdot \\ \cdot \\ J_7 \end{pmatrix}$$

Equations (3.5-1a), (3.5-2a) and (3.5-3a) can be written as:

$$\vec{N}_k = \{\alpha_{jk}\}\ \vec{n} \tag{3.5-5a}$$

$$\vec{R}_k = \{\beta_{jk}\}\ \vec{r} \tag{3.5-5b}$$

$$\vec{J}_k = \{\gamma_{jk}\}\ \vec{j} \tag{3.5-5c}$$

Let

$$
\left.
\begin{aligned}
\vec{M}_{1k} &= \vec{N}_k \\
\vec{M}_{2k} &= \vec{R}_k \\
\vec{M}_{3k} &= \vec{J}_k
\end{aligned}
\right\}
\implies
\vec{M}_k = \sum_{i=1}^{3} \vec{M}_{ik}
\tag{3.5-6}
$$

and

$$
\left.
\begin{aligned}
\hat{M}_1 &= \vec{n} \\
\hat{M}_2 &= \vec{r} \\
\hat{M}_3 &= \vec{j}
\end{aligned}
\right\}
\tag{3.5-7}
$$

and

$$
\left.
\begin{aligned}
m_{1jk} &= \alpha_{jk} \\
m_{2jk} &= \beta_{jk} \\
m_{3jk} &= \gamma_{jk}
\end{aligned}
\right\}
\tag{3.5-8}
$$

Combining (3.5-4) and (3.5-5a, b & c); we get

$$
\begin{aligned}
\vec{M}_k &= \{\alpha_{jk}\}\ \vec{n} + \{\beta_{jk}\}\ \vec{r} + \{\gamma_{jk}\}\ \vec{j} \\
&= \{\alpha_{jk}\}\ \hat{M}_1 + \{\beta_{jk}\}\ \hat{M}_2 + \{\gamma_{jk}\}\ \hat{M}_3 \qquad \text{by (3.5-7)} \\
&= \{m_{1jk}\}\ \hat{M}_1 + \{m_{2jk}\}\ \hat{M}_2 + \{m_{3jk}\}\ \hat{M}_3 \qquad \text{by (3.5-8)}
\end{aligned}
$$

$$\therefore \quad \overrightarrow{M_k} = \sum_{i=1}^{3} \{m_{ijk}\} \hat{M_i} \qquad\qquad (3.5\text{-}9)$$

Since $\hat{M_1} = \overrightarrow{n} = \begin{pmatrix} N_1 \\ \cdot \\ \cdot \\ \cdot \\ \cdot \\ N_7 \end{pmatrix}$

write: $\hat{M}_{1j} = N_j$ for $1 \leqslant j \leqslant 7$

Similarly $\hat{M_2} = \overrightarrow{r} = \begin{pmatrix} R_1 \\ \cdot \\ \cdot \\ \cdot \\ \cdot \\ R_7 \end{pmatrix}$

With

$$\hat{M}_{2j} = R_j \quad \text{for } 1 \leqslant j \leqslant 7$$

and

$\hat{M_3} = \overrightarrow{j} = \begin{pmatrix} J_o \\ \cdot \\ \cdot \\ \cdot \\ \cdot \\ J_7 \end{pmatrix}$

with

$$\hat{M}_{3j} = J_j \quad \text{for } 0 \leqslant j \leqslant 7$$

For simplicity and without loss of generality, J_0 is absorbed in J_1.

$$\hat{M}_3 = \begin{pmatrix} J_1 \\ \cdot \\ \cdot \\ \cdot \\ \cdot \\ \cdot \\ J_7 \end{pmatrix} \qquad \hat{M}_{3j} = J_j \quad \text{for} \quad 1 \leqslant j \leqslant 7$$

Thus,

$$\vec{M}_k = \sum_{i=1}^{3} \{m_{ijk}\}\hat{M}_i$$

$$= \sum_{i=1}^{3} \sum_{j=1}^{7} m_{ijk} \hat{M}_{ij} \qquad\qquad (3.5\text{-}10)$$

Though Equation (3.5-10) is mathemetically elegant, it may be less obvious for "non-mathematicians", therefore Eq. (3.5-1), (3.5-2) and (3.5-3) will used in the following discussion.

Since $\vec{N}_k$, $\vec{R}_k$ and $\vec{J}_k$ are all age-dependent and hence time-dependent, we may write:

$$\vec{N}_k = f(T) \; ; \; \vec{R}_k = g(T) \; ; \; \vec{J}_k = h(T)$$

$$\therefore \quad \vec{M}_k = M(T_k) = f(T) + g(T) + h(T) \qquad (3.5\text{-}10)$$

According to (3.5-11), N,R,J are developing in parallel.

In order to study the interaction between J and R,N, we define:

$$N(J_k) = N\left\{J(T_k)\right\} = \text{The Stage Pattern of N of a}$$

person in terms of his/her

stage of moral judgment, J_k

Similarly, $R(J_k) = R\left\{J(T_k)\right\}$

Also write:

$$N(J_k) = \sum_{i=1}^{7} \alpha_i (J_k) N_i \qquad\qquad (3.5\text{-}12a)$$

$$R(J_k) = \sum_{i=1}^{7} \beta_i (J_k) R_i \qquad\qquad (3.5\text{-}12b)$$

Postulate 2: Secondary Postulates of Moral Development

(A) The Development of Psychological Needs in terms of Moral Judgment Development

(i) $0 \leq \alpha_i (J_k) \leq 1$ for any k

and $1 \leq i \leq 7$ $\qquad\qquad (3.5\text{-}13a)$

(ii) For a fixed J_k,

$\alpha_i (J_k) \geq \alpha_{i+1} (J_k)$ for $1 \leq i \leq 6$ $\qquad (3.5\text{-}13b)$

(iii) For a fixed i, $\alpha_i (J_k) \leq \alpha_i (J_{k+1})$ with

$$J_k = J(T_k)$$

and $J_{k+1} = J(T_{k+1})$; $T_{k+1} > T_k$

(B) The Development of Human Relationship in terms of Moral Judgment Development

(I) $0 \leq \beta_i (J_k) \leq 1$ for any k

and $1 \leq i \leq 7$ $\qquad\qquad (3.5\text{-}14a)$

(ii) For a fixed J_k,

$$\beta_i(J_k) \geqslant \beta_{i+1}(J_k) \text{ for } 1 \leqslant i \leqslant 6 \qquad (3.5\text{-}14\text{b})$$

(iii) For a fixed i, and $1 \leqslant i \leqslant 7$,

$$\beta_i(J_k) \leqslant \beta_i(J_{k+1}) \text{ with } T_{k+1} > T_k \qquad (3.5\text{-}14\text{c})$$
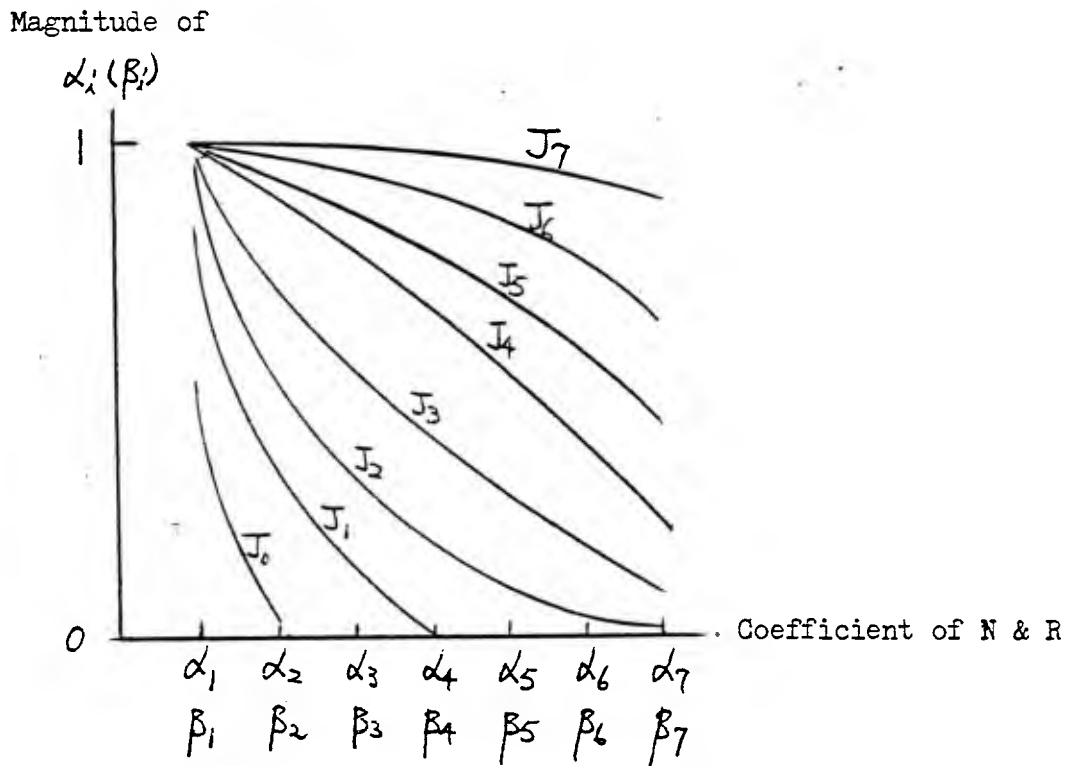
Figure 3.6 The Interaction of N, R and J

In addition, it is always possible to establish similar relations for $\beta_i(N_k)$

$$\gamma_i(N_k)$$

and

$$\alpha_i(R_k)$$

$$\gamma_i(R_k)$$

From Equation (3.5-14c), a person exhibits more altruism in similar social situations as his/her J_k increases. In other words, with a higher stage of moral judgment, one would show more altruism and higher degree of self-sacrifice to others. Thus, one would rate others more important than before. In this way, the position of R_0 = self in the Hierarchy of Human Relationships (R) tends to shift slowly from the top (maximum value of importance) downward.

Let $R_0 (J_k)$ = position of self in the R-Hierarchy when the moral judgment stage of the person is J_k.

$$J_k = J(T_k) \; ; \; T_{k+1} > T_k \qquad J_{k+1} \; " > " \; J_k \text{ in the sense}$$

that the dominant stage of J_{k+1} is in general higher than or equal to that of J_k.

$R_0(J_0) \quad R_0(J_1) \quad R_0(J_2) \quad R_0(J_3) \quad R_0(J_4)$

$R_1 \qquad R_2 \qquad R_3 \qquad R_4 \qquad R_5 \qquad R_6 \qquad R_7$
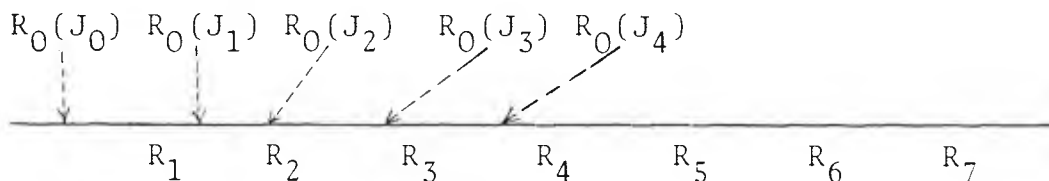
In order to elaborate the meaning of $R_0(J_k)$, let us consider a person P with $R_0(J_k) = R_i$ and without loss of generality, take i = 3, i.e., $R_0(J_k) = R_3$. This means that the person P and all members of R_i, $1 \leq i \leq 3$

form a whole group or body. In general, P would treat all others in this group (R_i, $1 \leqslant i \leqslant 3$) as equally important as or even more important than himself/herself, particularly in emergency or dilemma situations.

3.6 The Evolution of Human Morality

According to Pugh (1977), the Primary Values, which are related to N_1, N_2 and part of N_3; R_0 and R_1, were built into our system hardware (structure of brain and nervous system) by evolutionary process. (See Section 2.5) It is our basic assumption that the direction of evolution is to produce humankind with built-in system hardware which are incorporated with large values (tending to say, 0.7, 0.8 or even one) of α_i^o and β_i for $1 \leqslant i \leqslant 7$.

Let G_k = kth Generation of Evolution

(G_k is earlier than G_{k+1})

$G_k \{\alpha_i^o\}$ = a set of built-in values α_i^o, $1 \leqslant i \leqslant 7$, in the kth Generation of Humankind.

$G_k(\alpha_i^o)$ = the built-in value, α_i^o in the kth Generation of Humankind.

Similarly, $G_k\{\beta^o\}$ and $G_k(\beta^o)$ are defined.

It is postulated that

(i) $G_k(\alpha_i^o) \geqslant G_k(\alpha_{i+1}^o)$ for $1 \leqslant i \leqslant 6$

$G_k(\beta_i) \geqslant G_k(\beta_{i+1})$

(ii) $G_k(\alpha_i^0) \leqslant G_{k+1}(\alpha_i^0)$

$$\text{for } 1 \leqslant i \leqslant 7$$

$G_k(\beta_i) \leqslant G_{k+1}(\beta_i)$

The following graph illustrates the above inequalities.
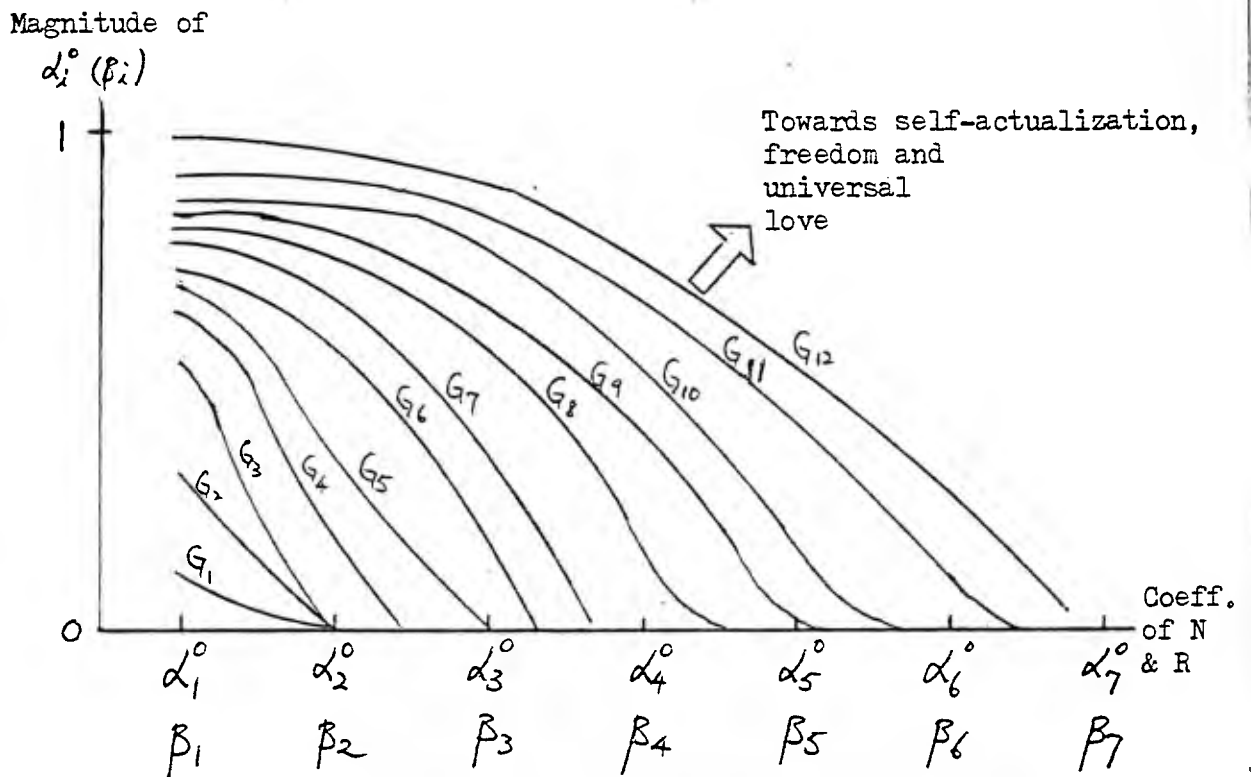
Figure 3.7.   An Evolutionary Pattern of Human Morality

The direction of human evolution is towards self-actualization, freedom and universal love.

3.7   General Remarks

The whole chapter merely gives a primitive sketch of the fundamental nature of moral development. Most

of the refined details have yet to be discovered and elaborated. The behavioural aspects of moral development were not discussed explicitly in terms of the fundamental parameters N, R and J.

Generally speaking, the main objectives of our theoretical model are: (1) To study the development of human morality in an elegant scientific manner. (2) To incorporate some of the major psychological approaches in the model (3) To investigate the ultimate goal of human development. The following paragraphs attempt to elaborate these objectives in further details.

(1) Scientific Study of Moral Development

The major tasks include: (1) To introduce a scheme of mathematical symbols and terminologies into the study of Moral Development. This will provide a basic framework for further extension and elaboration. (ii) To establish a set of basic postulates (iii) To carry out deductions in a logically consistent manner. In this way, most of the deductions and equations are in the form of inequalities and summations at this stage. However, this rule does not prevent the use of graphical figures and sophisticated mathematical expressions as illustrations of the arguments. (iv) To incorporate findings in Natural Science (e.g., Biology and Sociobiology) into the model.

(2) Incorporation of Current Psychological Approaches

As mentioned elsewhere in this chapter, different current approaches are employed in the deduction of our model. Two major ones are: (i) Humanistic Psychology for the discussion of the development of Psychological Needs, and (ii) Cognitive Developmental Theory of Morality for the discussion of the development of moral judgment. In addition, Evolutionary Theory and Sociobiology form a base for the discussion of the concepts of Human Relationships and Evolutionary Development of morality.

(3) Ultimate Goal of Development

It has been emphasized that the ultimate goal of individual development is towards self-actualization, freedom, universal love, and universal justice. The fittest person for survival is the person with most free-freedom - freedom to self-actualize, to be oneself, to satisfy all basic needs, to love and be loved etc. In short, the fittest is the freest. Similarly, the ulti- mate goal of human evolution is towards freedom and universal love. The fittest group for survival is the group with all or most people enjoying freedom, showing universal love and practising universal justice.

4. Fundamental Nature of Moral Development: An Objective
    Measure

4.1. The Construction of a New Test of Moral Development.

In order to test some of the essential hypotheses of
the theory established in Chapter 3, an objective measure
called the Moral Development Test (MDT) was constructed.

The MDT consists of a number of hypothetical dilemma
situations and two different forms of the MDT were prepared,
with an extension of Form A (called Form A$^+$) for adults
(see Appendix 5(A)).

Form A	Form B
1. A Lost Bag	1. The Young Robber
2. The Sinking Boat	2. Freedom of Speech
3. A Doctor's Dilemma	3. Car Accident
4. Car Accident	4. Bank Robbery
5. The Criminal	5. Civil War

TABLE 4.1. Two Different Forms of the MDT

Notes on the different forms of the MDT:

(1) The item "Car Accident" appears in both Forms A and
    B.

(2) The item "Civil War" has two versions. The one used in Form B is a shorter version. The longer version used in Form A$^+$ includes 7 item responses instead of 6 in Part I and 15 statements instead of 9 in Part II. (For details, see Appendix 5(A)). The longer version of the item "Civil War" is combined with the 5 items in Form A to form the MDT Form A$^+$.

The MDT Form A$^+$ is intended for adult subjects who are likely to be able to cope with the more difficult situation described in the item "Civil War" (long version). Another reason for asking the adult subjects to answer one more item than the adolescents is that more information can be obtained from the adult group.

(3) In common with other objective measures, the MDT can be scored and analysed by computer.

4.2. General Features of the Moral Development Test (MDT)

1. Hypothetical Dilemma Situations

Each MDT item describes a hypothetical dilemma situation and the subject is asked to imagine himself/ herself in the situation. Most of these hypothetical situations are extreme and in general rarely occur in the daily-life of most people. However, all MDT situations were written based on the principle that such situations are definitely possible in real-life.

The use of hypothetical dilemma situations is a
common technique in moral research (e.g. Kohlberg's
Moral Dilemma Instrument; Rest's DIT and many others;
See Section 2.5). On the other hand, it generates an im-
portant research issue, namely, is it meaningful to use
hypothetical situations in moral research? Two relevant
points can be made:

(i) Two similar arguments criticizing the use of hypothe-
tical dilemmas are as follows:
(a) It is often argued that since the test is based on
hypothetical situations, it is little to do with moral
behaviour in reality.
(b) A number of subjects told the researcher that
what they answered on the questionnaire might not
reflect exactly what they would act if they situa-
tion did really happen in their lives in the future
because in such real-life situations, they would be
much more emotional and might be completely irrational.
In addition, real-life situations are more complicated
than the hypothetical situations in the test.

Both arguments are quite sound but the first one
denies, in principle, the functions of all psycholo-
gical tests. It is true that hypothetical situations
are different from real situations; controlled experi-
mental situations are different from natural ones.
However, they are not unrelated; the stronger the
relations between them, the better the test or expe-
riment is. The major objective of empirical data of

all sorts is not only to provide the very limited (but extremely important) support for the researcher's hypothesis, but to give some insights for inducing general laws or principles and to establish new theories.

Thus the meaningfulness of using hypothetical dilemma situations in moral research depends on (a) whether there is a strong relation between the subject's responses to the test and their actual moral action and/ or (b) whether the empirical data collected by such hypothetical dilemmas help the researcher to induce and establish general laws of moral behaviour, which can then be tested by some other empirical methods.

It should be noted that answering a questionn-aire is also a real-life action and in so doing goes through the full process of the Moral Judgement and Decision System (See Section 2.5). A good hypotheti-cal dilemma situation should catch a subject's attention, disturbs him/her emotionally and generate responses not very much different from those involved in similar real-life situations.

(ii)The use of hypothetical dilemma situations is an eco-nomic and practical way for the exploration of the whole pattern of moral development. It is so because (a) the data collection procedure does not require complicated or sophisticated research facilities. Hence, it is less expensive than many other methods

such as experimental or observation methods.

(b) This form of data collection procedure in general does not cause the subjects too much trouble.

2. <u>Test Format.</u>

The test format of the MDT is based on Rest's (1979a) Defining Issues Test (DIT).

The following paragraphs should be read in parallel with the sample copies of the MDT in Appendix 5(A).

Each MDT item describes a hypothetical dilemma situation and is followed by sets of questions in two parts. Part I consists of a set of persons or a set of specified conditions denoted by X_1, X_2, X_3 ... etc. Subjects are asked to rate each X_i on a 7-point scale (From "Definitely YES" to "Definitely NO") and to select the top three choices from the X_is and put them in order. Part II is similar to the DIT; it consists of a set of 9 statements with the exception of the item "Civil War" (long version) which consists of 15 statements. Subjects are asked to rate on a 5-point scale (From "Very Great Importance" to "No Importance") how important each of the statements would be in deciding their answers in Part I. They are also asked to put their top three statements in order of importance.

Further explanation of the details and rationale of this kind of Test Format is reviewed in Section 2.3.4.

3. Judgement and Decision.

The Part I questions of the MDT tend to explore the emotional aspect of moral development by asking the subjects to make decisions under certain specified conditions. Subjects are instructed to give the first answers that come into their mind. On the other hand, the Part II questions tend to explore the rational aspect of moral development, namely, the general structures of moral judgement. Subjects are asked to answer Part I questions before doing the Part II ones: Thus, subjects are asked to make decisions first and then to judge or rationalize what they have decided. However, as mentioned in Section 2.5, most decision theories assert that people judge the situation before they decide on how to act. Is there a contradition between our test design and general decision theories?

The answer is no. First of all, the MDT is designed primarily for investigating the general structures underlying both the rational and emotional aspects of moral development; it is not used to trace the actual process of the Moral Judgement and Decision System (MJDS). In other words, the present MDT design follows a research strategy which aims at the study of the Ordinary Level of Judgment and Emotional aspect of moral development. It starts with asking subjects to give their decisions first, which are supposed to be emotional and are sensitive

to external stimulus (i.e. easily changed or affected by
external stimulus) before asking them to judge rationally
the hypotehtical situations and their decisions. Thus,
the emotional responses given in Part I are mainly direct
projective ones ("gut" feeling type) and subjects are
presented with minimal interaction with testing materials
which may disturb or affect their own decisions. However,
this does not mean that when subjects answer the Part I
questions, they do not think and judge. Indeed, they go
through the whole process of MJDS to arrive at a decision
but the time used is usually short - a few seconds to a
few minutes. After answering Part I questions, subjects
are asked to judge or think rationally their decisions and
answer Part II questions. This would of course mean that
subjects' judgment in Part II may be greatly affected by
their Part I responses. Such a design, it is hypothesized,
will generate responses which are more closely related to
actual moral action than any other current test designs in
moral researches. In addition, it is found that the pre-
sent MDT design is a natural one, which most of the subjects
find it easy to follow and answer, except those who are at
a cognitive level below that required for understanding the
verbal meaning of the questionnaire.

Now, an important problem arises: To what extent the
order of the Part I (emotional decision) and Part II
(rational judgment) questions affects the subjects' responses?
Most probably, changing the present order of Parts I
and II will lead to slightly different response patterns

among similar samples of subjects. It is assumed that
subjects answering Part II first tend to judge at a level
which is a little bit higher than those answering Part
II after Part I. Nevertheless, this does not mean that
using the present MDT with a change of the order of Parts
I and II questions will generate responses which give
the subjects' Optimal Level of Judgment because (i) MDT
is designed so that there is an extensive and deep inter-
action between Parts I and II questions (ii) the design is
a first-personal one and it allows in general subjects
a high degree of free imagination and projection in giving
their responses. For the study of the Optimal Level of
Judgment, Kohlberg's Moral Judgment Instrument and Rest's
Defining Issues Test are probably the best test instruments.

In short, the effect of the order of, and the inter-
action between Parts I and II questions on the subjects'
responses is one of the crucial topics in the future
research of MDT.

4. First Person View.

Let FPV = a subject's moral judgment about a set of
hypothetical dilemmas in First-Person View

TPV = a subject's moral judgment about a set of
hypothetical dilemmas in Third-Person View.

Ma (1980) argues that there are differences between
FPV and TPV. TPV is supposed to be "rational, objective

and less personal and affective" (p. 57-58). On the other hand, FPV is said to be "more concerned with the affective aspect of a person's morality and hence will predict better the moral action of the person" (p.58).

In general, FPV is suitable for investigating the Ordinary Level of Moral Judgment while TPV is good for the Optimal Level. Hence, MDT is designed in First-Person View.

5. Degree of Imagination

In order to test effectively the emotional aspect of moral development of a subject, the MDT situations are constructed in a way so as to provide the subjects the highest degree of freedom in projecting and imagining themselves in the situations.

The degree of imagination of a MDT item is defined as the degree of easiness the subjects can imagine themselves in the hypothetical situations or project themselves onto the hypothetical characters concerned in the situations and Part I choices (i.e. X_is).

Let f_1 = degree of imagination of the hypothetical situation (described by paragraphs just before the Part I questions)

f_2 = degree of imagination of the choices of Part I

$f = f_1 + f_2$.

(i) f_1 is higher (denoted by f_1 = *) if the personal details (e.g. sex, age, occupation, educational background etc) of the main character concerned in the hypothetical situation are not explicitly or implicitly described. Otherwise, f_1 is low and is denoted by f_1 = 0.

(ii) f_2 is high (denoted by f_2 = *) if the X_is in Part I are concerned only with general personal details (e.g. sex, age, occupation, relationships with the subject etc.) and do not involve any specific situational details like X_i is near death from a rare disease or X_i wants to buy a luxurious car. Otherwise f_2 is low and is denoted by f_2 = 0.

	f_1	f_2	$f = f_1 + f_2$
A Lost Bag	*	0	*
The Sinking Boat	*	*	* *
A Doctor's Dilemma	0	0	0
Car Accident	*	* (1)	* *
The Criminal	*	0 (2)	*
The Young Robber	*	*	* *
Freedom of Speech	0	0	0
Bank Robbery	*	0	*
Civil War	0	0	0

TABLE 4.2: Degree of Imagination of the MDT items

Notes: (1) In "Car Accident", "X_1 = a medical doctor who is on emergency case" is quite situationally specific, therefore f_2 of this item should in fact be a little bit smaller than "$*$" .

(2) It should be noted that the X_is of "The Criminal" are specified by five different sets of siutational details (Situations 1 to 5). Similarly, the X_is of "Bank Robbery" are specified by two situations. Therefore, the f_2 of both items are low.

6. Comparing MDT with Kohlberg's MJI and Rest's DIT.

The following table summarizes the general features of MDT, Kohlberg's Moral Judgment Instrument (MJI) and Rest's Defining Issues Test (DIT).

	MDT	MJI	DIT
1. Hypothetical Dilemma Situations.	V	V	V
2. Test Format	Closed	Open	Closed
3. First-Person View (FPV) or Third-Person View TPV)	FPV	TPV	TPV
4. Degree of Imagination	High	Low	Low
5. Systematic Study of (a) Structures of Moral Judgment	(Ordinary Level)	(Optimal Level)	(Optimal Level)
(b) Human Relationships and Psychological needs	V	X	X

Notes: "V" = Yes   "X" = No

TABLE 4.3   Comparing MDT with MJI and DIT.

4.3. The Use of MDT as a Test of the Theory

MDT is designed as an instrument for testing the
theory established in Chapter 3. The MDT items are
constructed in a way such that the Part I questions test
the levels of N (Psychological Needs) and R (Human
Relationships) and Part II statements generate responses
which give the Ordinary level of J (Judgment) of the
subject. The methodology and research problems underlying
Parts I and II are different and therefore they will be
described separately.

In general, the paragraphs describing the hypotheti-
cal dilemma situation are referred to as the "hypothetical
situation" or simply "the Situation" ; the X_1, X_2, X_3 etc.
in Part I to be "Item responses"or "X_is" or "Part I Choices"
or "Part I questions". The statements in Part II are
called "Part II statements" or "Part II questions".

4.3.1. Part I Questions

1. Central Theme Analysis of N.

It is extremely difficult, if not entirely impossible,
to construct situations and item responses (X_is) with
a theme representing purely and uniquely a particular N_i
only. Indeed, such situations may not exist in psycholo-
gical reality.

Moreover, it is true in principle that any particular situation of X_i encounters all the N_is (i.e. N_1 to N_7) to some extent with some N_is emphasized more strongly than the others.   On the other hand, it is difficult and probably impossible at this stage to account theoretically a hypothetical situation of a X_i in terms of all N_is (N_1 to N_7). Therefore, we would hypothesize a central theme N_i for each situation and each X_i. Or put it in other way, when the items were constructed, the writer attempted to express the central themes of each situation and X_i as clearly and naturally as possible. However, it should be emphasized that these central themes are subjectively set or assigned by the writer and may therefore be debatable in some cases. Nevertheless, subject's ratings will be interpreted in terms of these central themes.

2. Relativistic Value.

Let us consider a particular MDT item with the central theme of the situation denoted by N_k. In general, each Part I question X_i also has a (central) theme, say, N_i. The subject is usually asked to make a choice between N_i and N_k and shows his/her extent of positiveness or negativeness for N_i with respect to N_k.

In the construction of the theoretical hierarchies of N and R, the frame of reference or the baseline is

implicitly and obviously set on N_1 and R_o respectively.
Thus, the levels of N_p and R_p' (where $P = 2, 3, \text{---} 6, 7$,
and $P' = 1, 2, 3, \text{---} 6, 7$) are clearly defined with res-
pect to N_1 and R_o respectively. On the other hand, in the
MDT items, the subjects are asked to make choices between,
say N_i and N_k (or R_i and R_k), where N_k (or R_k) is not
necessary N_1 (or R_o). Thus, their ratings are concerned
with N_i (R_i) with respect to N_k (R_k) rather than N_i (R_i)
with respect to N_1 (R_o).

Let $N_{i(k)}$ = The evaluation of the importance of N_i
with respect to N_k

$N_{i(1)}$ = The evaluation of the importance of
N_i with respect to N_1

The N_i used in Chapter 3 is the $N_{i(1)}$ defined above.
It is obvious that

$$N_{i(k)} \neq N_{i(1)} \quad \text{for } k \neq 1.$$

(Similarly for R, $R_{i(k)} \neq R_{i(o)}$ for $k \neq o$)

Theoretically speaking, the base or reference level
N_k of $N_{i(k)}$ does not have any effect on the original order
of the theoretical hierarchy. The base level is just like
the zero-point in a temperature scale. Different tempera-
ture scales have different zero-points. For example,
the freezing point of water in Centigrade Scale is $0^\circ C$ but
in Fahrenheit Scale is $32^\circ F$. Nevertheless, the physical
law underlying the concept of temperature is not affected
at all by such differences in the temperature scale.

However, the comparisons of empirical data of N (or R) with reference to different base levels are difficult and problematic because (i) the subjective assignment of the central themes to a situation or X_i may not be accurate and may oversimplify the situation. For example, a hypothetical situation or X_i may have two or more equally important central themes (ii) The psychological distances between N_is (R_is) have not been accurately worked out.

Thus, it must be very careful to add or operate data across situations or X_is with different central themes.

3. The Interaction between N and R.

In reality, the fundamental parameters N, R and J are not completely orthogonal, that is, they are not strictly or mutually independent of each other. (See Section 3.5). One difficulty in the empirical study of N and R is that it is difficult to construct MDT items with N being kept constant for different R_is. For example, in the item "The Sinking Boat", the central theme of the hypothetical situation is obviously self-survival (N_1) and all the item responses X_i are in terms of persons. It seems that N is being kept constant at N_3 for all X_is. However, the case is not so simple because as R varies, N usually varies too. Consider X_4 = your brother or sister and X_5 = someone you don't like or an enemy. In the X_4 case, the theme is N_3 (Belongingness and love

needs) while in X_5, the theme may be said to be N_5 or N_6 for subjects of high J.

In short, subjects' ratings in Part I reflect both the parameters N and R in one setting. In addition, our theoretical categorization of the hierarchies of N and R often simplifies reality considerably, empirical data may throw some light on the refined subdivision of these hierarchies.

4. The Central Themes of MDT Items.

The following notations and notes are relevant to the discussion in this section:

(i) R_4 is tentatively subdivided into three sub-groups:

R_{41} = The weakest, the youngest and the oldest strangers

R_{42} = People of high social status or reputation, e.g. famous scientists.

R_{43} = All other types of strangers.

(ii) We also define,

$N_3(R_{41})$ = a need for helping and showing affection or sympathy to people in R_{41}.

Thus $\alpha_3(\beta_{41})$ is particularly good for the study of empathy and altruism.

(iii) For each MDT item, a theoretical hierarchy of the ratings of X_is is postulated.

Assuming Definitely YES = 1 to Definitely NO = 7,

$X_i < X_j$ means that the rating of X_i is predicted
to be smaller than that of X_j.

$\{X_i, X_j, X_k\}$ means that the ratings of X_i, X_j or X_k
are predicted to be equal.

(iv) The assignments of central themes (deonted by T) to
the situations and X_is of MDT items are based on the
theory established and empirical data collected in the
Pilot Study. These assignments are subjective and
provisional; they are subjected to future revision
when more researches have been done.

(v) In the following discussion, we would constantly refer
to subjects of two different types: (1) Subjects of
high N (i.e. α_is are generally high even for i>4)
(2) subjects of low N (i.e. α_is are high only for
i<3 and low for i>4). Subjects of high N are potential
self-actualizing person.

(1) A Lost Bag.

(a) The Situation : $T = N_4$

The central theme is whether the social laws that
"one must not steal" should be upheld or not. Thus it
concerns with social recognition or esteem from others.

(b) Part I (only some of the X_is are elaborated)

$$X_1: \quad T = N_{1/6} + N_4 \simeq N_4$$

It is supposed that both the self-actualization or the fulfilment of ones potential and social recognition or social status are the central themes. However, N_4 is slightly predominant over $N_{5/6}$ because of the illegal action, therefore, T is set to be N_4.

$$X_5: \quad T = N_5 + N_4 \simeq N_4$$

It concerns with one's self-esteem and esteem from one's best friend. The promise is not a legal one but a kind of social contract - thus it is at a level higher, or a little bit higher than N_4 but still lower than N_5.

$$X_6: \quad T = N_x$$

For subjects of high N, there is no such need for desire to do X_6 (denoted by N_x) because it is a meaningless, childish or harmful (both to oneself or others) act. Hence, it should be valued as the least importance. On the other hand, for subjects of low N, it is concerned with mainly a need for "showing off" or a need for esteem from others.

(c) <u>Theoretical Hierarchy of Ratings (T.H.R.)</u>.

For subjects of High N: $X_3 < X_2 < X_4 < X_5 < X_1 < X_6$ (4-1)

For subjects of Low N : $\{X_3, X_2\} < \{X_4, X_5, X_1, X_6\}$

               (4-2)

For subjects of high N, it is argued that one would act altruistically and rates X_3 slightly important than X_2.

For subjects of low N, the discrimination is not so refined as those of high N, it is hypothesized that two clusters will be formed: $\{X_3, X_2\}$ and $\{X_4, X_5, X_1, X_6\}$.

(2) The Sinking Boat

(a) The Situation: $T = N_1$

(b) Part I.

X_7: For subjects of particularly high N, e.g. self-actualizing persons, the dilemma is concerned with a N_5 or N_6 level of self-actualization and universal love. For other subjects, X_7 will be treated as an antagonistic person and it is "socially right" not to sacrifice for or help people like X_7. It is obvious that, apart from $N_4(R_7)$, $N_4(R_6)$ (e.g. X_7) is supposed to have the least positiveness given by a subject in the N_4 level.

(c) T.H.R.

All subjects: $\{X_4, X_9\} < X_5 < X_8 < X_2 < X_3 < \{X_1, X_6\} < X_7$

$$(4-3)$$

(3) A Doctor's Dilemma

(a) The Situation: $T = N_5$ (or N_6)

For high N subjects, the theme is self-actualization, that is, the fulfilment of one's ideal and potential to help people in underdeveloped countries. For low N subjects, the situation may, however, be interpreted as a socially recognized "right or good" act.

(b) Part I.

$$X_1 : T = N_3 - N_5 \qquad \text{(Negative sign means negation of the needs concerned)}$$

The theme is both love and self-esteem needs. However, for some / subjects
$-N_5$ may be a little bit dominate over N_3 in this case because Peter's action hurts Susan's self-esteem and damages her process of self-actualization. Though both X_1 and X_2 involve, to a large extent, N_3 needs; X_2 is supposed to have a strong theme of $N_3(R_1)$ but X_1, a weak $N_3(R_1)$. It is so because Peter is supposed to be the very person who <u>understands</u> and loves Susan. That is to say, Peter is expected to help Susan to achieve the State of Self-actualization. On the other hand, Susan's mother's request in this case is most probably regarded as "normal and reasonable". Young subjects may think that mother is a person who loves them and therefore should be loved; but she is not the person who is expected to understand

them thoroughly especially in matters of ideal like this
case. Therefore, Susan's mother's act is not supposed to
hurt Susan at all.

(c) T.H.R.

The test stimulus (the contents of the situation
and X_is) may exert a greater effect on the subjects'
ratings or responses in this case because the item offers
subjects a low degree of freedom in projecting or
imagining themselves in the situation. In addition, the
theme of being altruistic and nice to deprived people may
also tempt the subjects to show a higher degree of altruism
in their ratings.

For all subjects: $X_2 < \{X_5, X_3, X_4, X_6\} < X_1$ (4-4)

The basis for this theoretical hierarchy is quite
complex. Let us consider the N & R of each X_i:

$$X_1 = N_3(R_1) - N_5(R_1) \qquad X_2 = N_3(R_1)$$
$$X_3 = N_5(R_3) \qquad X_4 = N_2(R_0)$$
$$X_5 = N_5(R_5) \qquad X_6 = N_4(R_4)$$

Based on the $N_i(R_j)$ levels, the predicted hierarchy
is likely to be:

$$X_2 < X_1 < \{X_3, X_5, X_6\} \qquad (4-5)$$

$(X_4$: floating, highly dependent on subjects'
degree of altruism and J level)

(A very rough general guide to establish the predicted hierarchy is to add the level numbers, i.e. i & j of $N_i(R_j)$. The smaller the sum, the more positive the ratings should be. However, this method is not supposed to be a theoretically elegant one at the present stage because we have not established the necessary refined details of N_i & R_j. Furthermore, the J level is not also considered in this case).

In principle, X_4 should be in a position near or even above (i.e. smaller than or "<") X_2. However, in this case, subjects tend to undervalue the safety needs with respect to the self-actualization needs. In other words, subjects tend to show a much higher degree of altruism or self-sacrifice if the situation involved is a clear-cut "moral or right or good or ideal" act. The position of X_1 is predicted to be at the bottom of the hierarchy in (4-4) instead of second to X_2 in (4-5) mainly because of the emotional disturbance aroused by Peter's "selfish" act.

The difficulty in constructing the theoretical hierarchy in this item is due to the fact that the ranges of N_i and R_j levels are particularly large; N is from N_2 to N_5 and R is from R_0 to R_5.

(4) Car Accident.

(a) The Situation: $T = N_4$

The situation looks apparently to be a simple one but the underlying theme of the dilemma is sharp and

and extreme. The first stranger rescued is used as a
testing person to see whom the subjects would rate higher
and whom lower. However, the situation is complicated by
one variable, namely, justice or fairness in treating the
first stranger whom the subject is supposed to rescue in
the first place.

(b) T.H.R.

For all subjects: $X_1 < X_6 < \{X_7 < X_4\} < \{X_9, X_8\} < \{X_2, X_3\} < X_5$

$$(4-6)$$

(5) <u>The Criminal</u>

(a) The Situation: $T = N_4$

The general central theme underlying the 5 situations
is N_4. In addition, there is also a different secondary
central theme underlying each situation:

Situation 1 : This is a testing situation; it is concerned
predominantly with N_4. The ratings of this
situation can be used as a baseline to see
what additional needs would make a subject
rate the situation higher or lower than this
one.

Situation 2 : It emphasizes on the role of a police officer,
which is supposed to defend social law.

Situation 3 : The secondary theme here is $N_3(R_{41})$.

Situation 4: The additional theme is $N_1(R_o)$ - self survival.

Situation 5 : Again the secondary theme is $N_3(R_{41})$ but the number of people involved is a few thousand in this case while only 1 person is involved in Situation 3. On the other hand, the person concerned in S3 is a son of X_i, thus bears some relation with the subject, but the people involved in Situation 5 are assumed to have no close relationship with the subject.

For all subjects: $S2 < S1 < \{S3, S5\} < S4$.   (4-7)

The exact order of X_i's is left for empirical exploration.

(6) The Young Robber.

(a) The Situation: $T = N_2 + N_4 \approx N_2$.

The central theme is concerned with one's safety (N_2) and the social norm of responsibility (N_4) or mutual help in face of criminal events. It is assumed that for Low N subjects, N_2 dominates, while for high N subjects, N_4 is more desired; this difference will be shown in the ratings of X_is. Nevertheless, the theme of the situation is supposed to be dominated by N_2.

(b) T.H.R.

For all subjects: $\{X_3, X_8\} < X_4 < X_2 < X_5 < \{X_1, X_7\} < X_6$ (4-8)

(7) <u>Freedom of Speech</u>

(a) The Situation: $T = N_4 + N_{5/6} = \begin{cases} N_4 \text{ for low N subjects} \\ N_{5/6} \text{ for high N subjects} \end{cases}$

For high N subjects, Mr. Young's act may be interpreted as something concerned with human right, democracy and universal justice. But low N subjects tend to regard Mr. Yong's act as a socially right or moral one.

(b) Part I

$$X_3 : T = N_3 + N_4 \simeq N_4$$
$$X_4 : T = N_3 + N_4 \simeq N_4$$
$$X_5 : T = N_3 + N_4 \simeq N_3$$

The themes underlying X_3, X_4 and X_5 are both the affection for one's family and one's esteem from others. However, for X_3 and X_4, N_4 is assumed to be a little bit predominant over N_3; while for X_5, the theme emphasized is N_3 rather than N_4.

(c) T.H.R.

For all subjects: $\{X_1, X_2\} < X_6 < \{X_3, X_4, X_5\}$ (4-9)

One special feature of this item is worthwhile for discussion here. The hypothetical situation and X_is are likely to stir up the emotion of particularly young or low N subjects who would then tend to focus on emotional

"retaliation" rather than the underlying theme of the situation, namely, Freedom of Speech. The ratings of these subjects will in general be dependent on the amount of loss described by X_i. The larger the loss, the more desperate one would be and therefore the stronger is one's motivation to fight against the government. Consider the following example: $X_1 (T = N_2)$ and $X_4 (T = N_4)$, it is supposed in (4-9) that the ratings on X_1 should be more positive than those of X_4 but subjects may feel very emotional about the paralysis of the two legs in X_1 and insist on opposing the government, hence they would rate the strongly or Definitely No for X_1. On the other hand, cases like X_4 are less emotional or disturbing and the ratings may be less extreme and are most probably around the middle. Thus, the outcoming response appears to be X_4 more positive than X_1 which seems to contradict our theoretical prediction. Actually, the situation is com-plicated by two other factors: (i) The J level of the subjects, which may influence their ratings, has not been considered in the construction of (4-9). It should be noted that any situation is dependent on three fundamental parameters, N, R & J. In cases involving high N, the J factor may be more crucial. For example, in this case, subjects of low J may tend to emphasize on/physical loss or harm. (ii) The theoretical prediction given in (4-9) is based on the average values α_{ik} or $\overline{\alpha_{ik}}$. For situations involving extreme desperation and emotion of "retaliation", the instantaneous values $\alpha_{ik}(t)$ defined in Section 3.2 may

be more appropriate for explaining the decision and action. It is understandable that occasionally the pattern of instantaneous values $\alpha_{ik}(t)$ deviates considerably, for a short episode, from the average pattern of α_{ik} due to emotional variables.

(8) Bank Robbery.

(a) The Situation: $T = N_4$

For X_1 to X_4, the theme is mainly the defense of social law. For X_5 to X_8, subjects of high **N** would still maintain that the theme is N_4 with perhaps a deep groan of hard luck; on the other hand, subjects of low N may blame on X_is for damaging his/her safety needs and tend to react angrily to them by "revenge" - to report them to police.

(b) T.H.R.

Subjects of High N : $\{X_4, X_8\} < \{X_3, X_7\} < \{X_2, X_6\} < \{X_1, X_5\}$

$$(4-10)$$

Subjects of Low N ; $X_8 < X_7 < \{X_3, X_4, X_5, X_6\} < X_2 < X_1$

$$(4-11)$$

(9) <u>Civil War</u>

(a) The Situation: $T = N_1 (R_0 + R_1) + N_3 (R_1) \approx N_1 (R_0 + R_1)$

$$\simeq N_1 (R_0)$$

The general theme is the survival of self and the family. It also concerns with one's affection for one's family.

(b) Part I.

In this particular item, it is better to add the central theme of the situation to that of each X_i in the following discussion because of the complexity of the item. It is assumed that positive ratings implies a favour of needs with positive signs and a negation of needs with negative signs, and vice versa.

X_1: $T = N_1 (R_0 + R_1) + N_3 (R_1) - N_5 (R_0)$

To force one's daughter to marry someone she dislikes is supposed to damage one's self-esteem (N_5).

X_2: $T = N_1 (R_0 + R_1) + N_3 (R_1) - N_4 (R_0)$

Mr A is supposed to take care of his family by all means. "To do nothing but to - " is assumed to negate slightly this norm of responsibility in this case.

X_3: $T_1 = N_1 (R_1) + N_3 (R_1) + N_? (R_0) - N_2 (R_0) - N_1 (R_0)$

The act in X_3 is supposed to be a self-actualizing one. It saves one's family at the expense of one's safety, comfort and esteem.

X_4: $T = -N_1 (R_o)$

To commit suicide is regarded as an act highly negating one's N_1 needs.

X_5: $T = N_1 (R_o + R_1) + N_3 (R_1) - N_4 (R_o)$

To rob others' food in this case is also against social norm. It is regarded as a slightly selfish and immoral act.

X_6: $T = N_1 (R_o) - N_3 (R_1) - N_4 (R_o)$

To forsake one's family in this case is a selfish act which is both negative to $N_3 (R_1)$ and N_4.

X_7: $T = N_1 (R_o + R_1) + N_3 (R_1) - N_4 (R_o)$

The theme is concerned with social norm (N_4) which forbids us to eat human flesh. It also involves a mixed feeling of affection for one's family and the dead body.

	$N_1(R_0)$	$N_1(R_1)$	$N_3(R_1)$	$N_4(R_0)$	Other N_i	**	T.H.R.
X_1	+	+	+		$-N_5(R_0)$	$-N_5(R_0)$	2
X_2	+	+	+	-		$-N_4(R_0)$	3.5
X_3	-	+	+		*	$+N_{5/6}(R_0)$	1
X_4	-					$-N_1(R_0)$	7
X_5	+	+	+	-		$-N_4(R_0)$	3.5
X_6	+		-	-		$-N_3(R_1)$	6
X_7	+	+	+	-		$-N_4(R_0)$	5

* $= N_{5/6}(R_0) - N_2(R_0)$

**The major theme of X_i, assuming the theme of the situation

is $N_1(R_0 + R_1)$ and $N_3(R_1)$

TABLE 4.4   The Central Theme of the Item Responses

of "Civil War"

(c) T.H.R.:

$$X_3 < X_1 < \{X_2, X_5\} < X_7 < X_6 < X_4 \qquad\qquad (4-12)$$

Table 4.5 summarizes the central themes of all MDT
items in terms of N and R.

TABLE 4.5: The Central Themes of MDT Items

	The Situation	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	
(1) A Lost Bag	$N_4(R_o)$	N_4	N_1	N_3	N_4	N_4	N_x				
	(+)	R_o	R_o	R_1	R_o	R_2	R_o				
(2) The Sinking Boat	$N_1(R_o)$	N_4	N_3	N_4	N_3	N_3	N_4	$N_{5/6}$	N_3	N_3	
	(+)	R_{43}	R_{41}	R_{42}	R_1	R_2	R_{43}	R_6	R_{41}	R_1	
(3) A Doctor's Dilemma	$N_{5/6}(R_o)$	N_3	N_3	N_5	N_2	N_5	N_4				
	(+)	R_1	R_1	R_5	R_o	R_5	R_4				
(4) Car Accident	$N_4(R_o)$	N_3	N_4	N_4	N_3	N_4	N_3	N_4	N_4	N_4	
	(+)	R_1	R_{43}	R_{43}	R_{41}	R_6	R_2	R_{42}	R_{42}	R_{42}	
(5) The Criminal Situation No.	$N_4(R_o)(-)$	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}
		N_4	N_3	N_3	N_4	N_4	N_3	N_3	N_4	N_4	N_3
1.	$N_4(R_o)$	R_3	R_2	R_1	R_{43}	R_3	R_2	R_1	R_{43}	R_3	R_2
2.	$N_4(R_o)$										
3.	$N_3(R_{41})$	X_{11}	X_{12}	X_{13}	X_{14}	X_{15}	X_{16}	X_{17}	X_{18}	X_{19}	
4.	$N_1(R_o)$										
5.	$N_3(R_{41})$	N_3	N_4	N_4	N_3	N_3	N_4	N_3	N_3	N_4	
		R_1	R_{43}	R_3	R_2	R_1	R_3	R_2	R_1	R_{43}	

(6) The Young Robber	$N_2(R_o)$ (+)	N_4 R_{43}	N_3 R_{41}	N_3 R_1	N_3 R_2	N_4 R_{42}	$N_{5/6}$ R_6	N_4 R_{43}	N_3 R_1
(7) Freedom of Speech	$N_{5/6}(R_o)$ (+)	N_2 R_o	N_3 R_1	N_4 R_o	N_4 R_o	N_3 R_1	N_2 R_o		
(8) Bank Robbery	$N_4(R_o)$ (−)	N_3 R_1	N_3 R_2	N_4 R_3	N_4 R_4	N_3 R_1	N_3 R_2	N_4 R_3	N_4 R_4
(9) Civil War[1]	$N_1(R_o)$	$-N_5$ R_o	$-N_4$ R_o	$+N_{5/6}$ R_o	$-N_1$ R_o	$-N_4$ R_o	$-N_3$ R_1	$-N_4$ R_o	

Notes:

(1) For details of this item, see main text and Table 4.4.

(2) (+) means that positive rating in general favours or values X_i needs rather than the theme of the Situation, and negative rating values Situation theme rather than X_i theme.

(−) : opposite meaning of (+).

4.3.2. Part II. Questions

The Part II Questions of MDT are constructed based on Rest's (1979a) Defining Issues Test (DIT). One major difference between MDT and DIT is that MDT tends to investigate the Ordinary Level of Judgment while DIT explores Optimal Level.

The dominant J themes of most MDT Part II Statements are clearly expressed. In the following paragraphs, only a small number of statements are elaborated because of their complexity or apparently ambiguous meaning.

Notation used: J_D = Dominant J Level of the Statement

S = Statement Number

M = "Meaningless" Statement.

(1) A Lost Bag.

S9 : J_D = M

The statement is regarded as meaningless because if one took away the bag of money, one in some sense stole money from others, whether it is from the firm or from the Insurance company.

(2) The Sinking Boat.

S5 : J_D = M

The main issue in this item is: who is going to sacrifice, that is, one of the two persons in the boat is going to die. Thus, the statement that everyone should protect life by all means is not relevant in this case. However, it turns out that many of the subjects in the Pilot Study rate this item as quite or very important, probably because they did not carefully link the statement with the central issue of the hypothetical situation.

S6 and S8 : J_D = 5

The right to decide whether to be rescued at the expense of other's life and the right to decide whether or not to sacrifice for someone else in this case are basically human rights (rights for life, liberty and dignity), which should be respected by everyone in the society. Though social norm may presuppose or reinforce certain action in this case, the above basic human right is above the social norm or majority's opinion.

(3) A Doctor's Dilemma

S4 : J_D = 5B

The statement is concerned with one's attitude or value in dealing with such important life dilemma. It emphasizes on one's consistency of decision and action with one's moral belief or philosophy or value or attitude toward life and human interaction.

(4) <u>Car Accident</u>

S3 and S6 : $J_D = 4(5) \simeq 4$

The right of the first stranger and that of "I" in this case is regarded as the social right. It is slightly different from the basic human right involved in S6 and S8 in "The Sinking Boat". In other words, the right to decide whether to rescue someone or not without causing danger to one's life is slightly different from the right to decide whether or not to sacrifice oneself for others. The former one emphasizes more on social and legal right, while the latter one on basic human right.

The argument for S9 in "The Young Robber" is similar.

(5) <u>Bank Robbery.</u>

S6, S7 and S8 : $J_D = 2$

All these three statements emphasizes on one's personal interests and benefits.

The X_5 to X_8 (second half of the item) is constructed mainly to differentiate low J subjects from high J ones. It is supposed that high J subjects tend to give similar responses in both the 1st (X_1 to X_4) and 2nd (X_5 to X_8) halves. Low subjects tend to give more positive ratings in the 2nd half.

(6) <u>Civil War</u>

S7 : J_D = 4/5 ≃ 5

   While the right for life is clearly a fundamental
one, which is above the social law; the right for death
is more complicated, it concerns with the social law,
social responsibility and personal liberty. In this
case, the emphasis is on Mr. A's personal right to decide
on whether to commit suicide or not. It is argued that
the statement expresses a judgment involved both social
responsibility (J_4), and social contract, personal liberty
and dignity (J_5).

   The following table summarizes the dominant J level
of all MDT Part II Statements.

TABLE 4.6.   The Dominant J Level of MDT Part II Statements.

	1	2	3	4	5	6	7	8	9
A Lost Bag	2	4	4	5	6	3	4	3	M
The Sinking Boat	2	4	3	6	M	5	3	5	4
A Doctor's Dilemma	3	4	6	5B	3	2	4	5	5
Car Accident	4	2	4	5	3	4	6	5B	3
The Criminal	4	M	3	5B	4	2	5	3	5
The Young Robber	3	3	4	M	5	2	5	4	4
Freedom of Speech	4	M	5	4	5	2	3	3	6
Bank Robbery	3	4	5	4	5	2	2	2	6
Civil War	S1* 4	S2* M	S3 5	S4* 6	S5 4	S6* 2	S7* 5	S8 4	S9* 4
	S10* 3	S11* 3	S12* 5	S13* 4	S14 5B	S15* 4			

Notes: 1.   S = Statement Number

　　　　　M = Meaningless Statement

　　　2.   Civil War (Short Version) includes the following
　　　　　　statements in the above list : S1, S2, S4, S6, S7,
　　　　　　S9, S10, S11 and S12.   (All marked with "*").

TABLE 4.7: A Distribution of Part II Statements by J Levels

	Total No.of Statements	Dominent J Level									
		M		2		3		4		5 & 6	
		No.	%	No.	%	No.	%	No.	%	No.	%
Form A	45	3	6.7	5	11.1	10	22.2	12	26.7	15	33.3
Form B	45	3	6.7	7	15.6	9	20.0	12	26.7	14	31.1
From A[+]	60	4	6.7	6	10.0	12	20.0	18	30.0	20	33.3

4.4. Methods of Scoring and Analysis

The empirical data collected in this study not only provide a direct test of the theory established in Chapter 3, but also generate a set of scores which can be used for the study of individual differences in Moral Development.

Two major theoretical or heuristic methods of scoring are adopted: (i) Relevant ratings are added, with or without weightings, to give a set of scores or indices. (ii) Criteria based on the theory established are used for scoring part of the subjects' ratings and rankings. In addition, Inductive or Empirical Methods of scoring can also be designed after the data have been computed and analysed, for example, a set of scores can be generated by the factor analysis of the data.

The methods of scoring and analysis are very primitive and crude at this stage. As mentioned in Section 4.3.1., the addition of ratings is sometimes problematic. Our strategy is to generate as many as possible of the theoretical indices or scores. These scores would then be cross-validated by empirical data. The result is probably that some of these scores may have to be discarded or modified later on.

4.4.1. Part I.

1. Direct Addition of Ratings.

In order to simplify the follwing discussion, a set of notation is introduced in Table 4.8.

TABLE 4.8. <u>Ratings and Rankings of the MDT:</u>

<u>Notations of the Variables.</u>

	PART I				PART II			
	RATINGS		RANKINGS		RATINGS		RANKINGS	
	VAR-IABLE	NOTA-TION	VAR-IABLE	NOTA-TION	VAR-IABLE	NOTA-TATION	VAR-IABLE	NOTA-TION
(A) A Lost Bag	X_1	AAO1	1st C	ABO1	S1 .	ACO1	1st I.S.	ADO1
	To	To	To	To	To	To	To	To
	X_6	AAO6	3rd C	ABO3	S9	ACO9	3rd I.S.	ADO3
(B) The Sinking Boat	X_1	BAO1	1st C	BBO1	S1	BCO1	1st I.S.	BDO1
	To	To	To	To	To	To	To	To
	X_9	BAO9	4th C	BBO4	S9	BCO9	3rd I.S.	BDO3
(C) A Doc-tor's Dilemma	X_1	CAO1	1st C	CBO1	S1	CCO1	1st I.S.	CDO1
	To	To	To	To	To	To	To	To
	X_6	CAO6	3rd C	CBO3	S9	CCO9	3rd I.S.	CDO3
(D) Car Ac-cident	X_1	DAO1	1st C	DBO1	S1	DCO1	1st I.S.	DDO1
	To	To	To	To	To	To	To	To
	X_9	DAO9	4th C	DBO4	S9	DCO9	3rd I.S.	DDO3
(E) The Criminal	X_1	EAO1	1st C	EBO1	S1	ECO1	1st I.S.	EDO1
	To	To	To	To	To	To	To	To
	X_{19}	EA19	5th C	EBO5	S9	ECO9	3rd I.S.	EDO3

TABLE   4.8(Continued)

		PART I			PART II			
		RATINGS		RANKINGS		RATINGS		RANKINGS	
		VARI-IABLE	NOTA-TION	VARI-ABLE	NOTA-TION	VARI-ABLE	NOTA-TION	VARI-ABLE	NOTA-TION
(F) The Young Robber	X_1 To X_8	FAO1 To FAO8	1st C To 3rd C	FBO1 To FBO3	S1 To S9	FCO1 To FCO9	1st I.S To 3rd I.S	FDO1 To FDO3
(G) Freedom of Speech	X_1 To X_6	GAO1 To GAO6	1st C To 3rd C	GBO1 To GBO3	S1 To S9	GCO1 To GCO9	1st I.S To 3rd I.S	GDO1 To GDO3
(H) Bank Robbery	X_1 To X_8	HAO1 To HAO8	1st C To 3rd C	HBO1 To HBO3	S1 To S9	HCO1 To HCO9	1st I.S To 3rd I.S	HDO1 To HDO3
(K) Civil War	X_1 To X_7	KAO1 To KAO7	1st C To 3rd C	KBO1 To KBO3	S1 To S9	KCO1 To KC15	1st I.S To 3rd I.S	KDO1 To KDO5

Notes:

(1) C = Choice;   S = Statement;   I.S. = Most Important
Statement

(2) K instead of I or J is used for "Civil War" in order
to avoid confusion.

I.1. <u>Central Theme (CT) Scores</u>.

As discussed in Section 4.3., each MDT item has a central theme of N, the average of all the ratings in a MDT item is called the Central Theme (CT) Score.

	CT EQUATION	EQUATION NUMBER
A Lost Bag	$CTA = (AA01+AA02+AA03+AA04+AA05+ AA06)/6 = \sum_{P=o1}^{o6} AA_p/6$	4-13
The Sinking Boat	$CTB = \sum_{P=o1}^{o9} BA_p/9$	4-14
A Doctor's Dilemma	$CTC = \sum_{P=o1}^{o6} CA_p/6$	4-15
Car Accident	$CTD = \sum_{P=o1}^{o9} DA_p/9$	4-16
The Criminal	$CTE = \sum_{P=o1}^{19} EA_p/19$	4-17
The Young Robber	$CTF = \sum_{P=o1}^{o8} FA_p/8$	4-18
Freedom of Speech	$CTG = \sum_{P=o1}^{o6} GA_p/6$	4-19
Bank Robbery	$CTH = \sum_{P=o1}^{o8} HA_p/8$	4-20
Civil War (Short Version)	$CTK1 = (KA01+KA02+(8-KA03)+(8-KA04) +KA05+KA06)/6$	4-21
Civil War (Long Version)	$CTK2 = (6*CTK1+KA07)/7$	4-22

TABLE 4.9: <u>Central Theme (CT) Scores</u>

The interpretation of these CT-scores is as follows:

(i) If the sign of the item is positive, i.e. (+), then small CT-score would in general imply a negation of the central theme of the situation. On the other hand, large CT, positive for the central theme.

(ii) If the sign of the item is (-),

then   Small CT $\Rightarrow$ for the Central theme of the
                                Situation.

          Large CT $\Rightarrow$ against the central theme of the
                                Situation.

(iii) In the "Civil War" item, the ratings of X_3 and X_4 have to be reversed in order to be consistent with other X_is.

1.2. <u>N(R) indices</u>.

A few general remarks about the N(R) indices are noted as follows:

(i) N(R) indices are formed by averaging the subject's ratings of the relevant item responses in each MDT. $N_i(R_j)$ index indicates the degree of positiveness towards one's N_i needs when R_j people are concerned. For example, $N_3(R_1)$ index shows the extent of a subject's positive evaluation of his/her N_3 needs in the inter- action with people in R_1 category, that is, first order kin or close relatives.

(ii) The value of a $N_i(R_j)$ index is given by the relevant coefficient $\alpha_i(\beta_j)$. In other words, $N_i(R_j)$ index is coefficient $\alpha_i(\beta_j)$ calculated based on the subject's ratings in a MDT.

(iii) Different forms of MDT (i.e. A, B, and A^+) generate different sets of indices.

(iv) N(R) indices calculated from a subject's ratings are called Case or Person Indices, while those calculated by averaging all the subjects' ratings in a sample or group are called Group Indices.

(v) Some ratings are needed to be converted before they can be added consistantly. The conversion formula is

$$*Y = 8 - Y \quad \text{Where Y = original rating}$$
$$\text{and} \quad *Y = \text{converted or new rating.}$$

In principle, each item response X_i can appear in two different ways in a set of N(R) indices, one with a positive sign, the other with a negative sign (i.e. with a "*" sign).

(vi) The range of each $N_i(R_j)$ index is from 1 (Definitely YES or definitely for $N_i(R_j)$ needs) to 7 (Definitely No or definitely against $N_i(R_j)$ needs).

1.2. $N_i(R_j)$ Indices.

I.2.1.   MDT Form A.

The following notes apply to Table 4.10:

(1) Most of the indices in Table 4.10 will be studied empirically. The appropriate computer codes are inserted for reference.

(2) For convenience of discussion, $N_3(R_j)$ and N_4 are further subdivided:

   $N_{31}(R_j)$: The affection for R_j when R_j faces a heavy deficiency in N_1 or N_2 needs.

   $N_{32}(R_j)$: General affection for R_j excluding cases described by $N_{31}(R_j)$

   N_{41} : A need for defending or obeying social law, rules and regulations

   N_{42} : A need for esteem or positive reinforcement from others. It emphasizes on the Norms of Giving and Norms of Patriotism.

(3) The item response BA09 is not included in any of the indices because most of our subjects are not married.

(4) The item responses BA01 and BA06 are not included in $\alpha_{42}(\beta_{43})$ because not many people think that one should sacrifice oneself for a stranger.

TABLE 4.10

$N_i(R_j)$ Indices of MDT (A)

INDEX	COMPUTE CODE	N(R) EQUATION	EQ. NO.
$N_1(R_1+R_2)$	N11	$\alpha_1(\beta_1+\beta_2) = (*BAO4 + BAO5)/2$	4-23
$N_1(R_{41})$	N12	$\alpha_1(\beta_{41}) = (*BAO2 + *BAO8)/2$	4-24
$N_1(R_{42}+R_{43})$	N13	$\alpha_1(\beta_{42}+\beta_{43}) = (*BAO1 + *BAO3 + BAO6)/3$	4-25
$N_1(R_6)$	N14	$\alpha_1(\beta_6) = *BAO7$	4-26
$N_1(R_0)$	N15	$\alpha_1(\beta_0) = *AAO2$	4-27
N_1	N16	$\alpha_1 = (*AAO2 + \sum_{p=01}^{08} BA_p)/9$	4-28
$N_{31}(R_1)$	N31	$\alpha_{31}(\beta_1) = (AAO3 + BAO4 + DAO1)/3$	4-29
$N_{31}(R_2)$	N32	$\alpha_{31}(\beta_2) = (BAO5 + DAO6)/2$	4-30
$N_{31}(R_{41})$	N33	$\alpha_{31}(\beta_{41}) = (BAO2 + BAO8 + DAO4)/3$	4-31
	N34	$\alpha_{32}(\beta_1) = (CAO2 + *EAO3 + *EAO7 + *EA11 + *EA15 + *EA18)/6$	4-32
N_{31}	N35	$\alpha_{31} = (3\alpha_{31}(\beta_1) + 2_{31}(\beta_2) + 3\alpha_{31}(\beta_{41}))/8$	4-33
N_3	N36	$\alpha_3 = (8\alpha_{31} + 6\alpha_{32}(\beta_1))/14$	4-34

TABLE 4.10 (Continued)

INDEX	COMPUTE CODE	N(R) EQUATION	EQ.NO.
$N_{41}(R_0)$	N421	$\alpha_{41}(\beta_0) = (*AA01 + *AA02 + *AA04 + $ $*AA06)/4$	4-35
$N_{41}(R_1)$	N428	$\alpha_{41}(\beta_1) = (*AA03 + EA03 + EA07 + EA11 + $ $EA15 + EA18)/6$	4-36
$N_{41}(R_2)$	N429	$\alpha_{41}(\beta_2) = (*AA05 + EA02 + EA06 + EA10 + $ $EA14 + EA17)/6$	4-37
$N_{41}(R_3)$	N426	$\alpha_{41}(\beta_3) = (EA01 + EA05 + EA09 + EA13 + $ $EA16)/5$	4-38
$N_{41}(R_{43})$	N427	$\alpha_{41}(\beta_{43}) = (EA04 + EA08 + EA12 + $ $EA19)/4$	4-39
$N_{42}(R_{42}+R_{43})$	N414	$\alpha_{42}(\beta_{42}+\beta_{43}) = (BA03 + CA06 + DA07 + $ $DA08 + DA09)/5$	4-40
N_{41}	N413	$\alpha_{41} = (4\alpha_{41}(\beta_0) + 6\alpha_{41}(\beta_1) + 6\alpha_{41}(\beta_2) $ $+ 5\alpha_{41}(\beta_3) + 4\alpha_{41}(\beta_{43}))/25$ $= (6*CTA + 19CTE)/25$	4-41
N_4	N415	$\alpha_4 = (25\alpha_{41} + 5\alpha_{42}(\beta_{42} + \beta_{43}))/30$	4-42
N_5	N51	$\alpha_5 = (BA07 + 6*CTC)/7$	4-43

I.2.2. MDT Form A$^+$

For simplicity, only the N(R) equation for the item "Civil War" (Long Version) is established here. The N(R) equation for the whole MDT(A$^+$) can easily be derived by combining the following equations with those in Table 4.10.

Civil War (Long Version)

$N_1(R_o)$ Index:

$$\alpha_1(\beta_o) = (KA01+KA02+KA03+KA05+KA06+KA07)/7$$

$$(4-44)$$

$N_{31}(R_1)$ Index:

$$\alpha_{31}(\beta_1) = (KA03+ KA05+{}^*KA06+KA07)5 \qquad (4-45)$$

$N_{41}(R_1)$ Index:

$$\alpha_{41}(\beta_1) = KA05 \qquad (4-46)$$

N_5 Index:

$$\alpha_5 = KA03 \qquad (4-47)$$

I.2.3. MDT Form B

In the following derivations, the item response FA08 is not included because most of the subjects are not married. Thus,

$$CTF = \sum_{P=1}^{7} FA_P/7$$

TABLE 4.11

$\underline{N}_i \underline{(R}_j)$ Indices of MDT(B)

INDEX	COMPUTER CODE	N(R) EQUATION	EQ. NO.
N_1	BN15	$\alpha_1 = (KAO1 + KAO2 + {}^*KAO3 +$ $KAO5 + KAO6)/5$	4-48
N_2	BN29	$\alpha_2 = (FAO1 + FAO2 + FAO3 + FAO4 +$ $FAO5 + FAO6 + FAO7 + GAO1 +$ $GAO6)/9$	4-49
$N_{31}(R_1)$	BN31	$\alpha_{31}(\beta_1) = (DAO1 + FAO3 + GAO2 + GAO5$ $+KAO3 + KAO5 + {}^*KAO6)/7$	4-50
$N_{31}(R_2)$	BN32	$\alpha_{31}(\beta_2) = (DAO6 + FAO4)/2$	4-51
$N_{31}(R_{41})$	BN33	$\alpha_{31}(\beta_{41}) = (DAO4 + FAO2)/2$	4-52
$N_{32}(R_1)$	BN34	$\alpha_{32}(\beta_1) = ({}^*HAO1 + {}^*HAO5)/2$	4-53
$N_{32}(R_2)$	BN35	$\alpha_{32}(\beta_2) = ({}^*HAO2 + {}^*HAO6)/2$	4-54
N_{31}	BN36	$\alpha_{31} = (7\alpha_{31}(\beta_1) + 2\alpha_{31}(\beta_2) +$ $2\alpha_{31}(\beta_{41}))/11$	4-55
N_{32}	BN37	$\alpha_{32} = (2\alpha_{32}(\beta_1) + 2\alpha_{32}(\beta_2))/4$	4-56
N_3	BN38	$\alpha_3 = (11\alpha_{31} + 4\alpha_{32})/15$	4-57
$N_{41}(R_0)$	BN41	$\alpha_{41}(\beta_0) = ({}^*KAO5 + 7CTF)/8$	4-58
$N_{41}(R_1)$	BN42	$\alpha_{41}(\beta_1) = (HAO1 + HAO5)/2$	4-59
$N_{41}(R_2)$	BN43	$\alpha_{41}(\beta_2) = (HAO2 + HAO6)/2$	4-60
$N_{41}(R_3)$	BN44	$\alpha_{41}(\beta_3) = (HAO3 + HAO7)/2$	4-61
$N_{42}(R_{42})$	BN45	$\alpha_{42}(\beta_{42}) = (DAO7 + DAO8 + DAO9)/3$	4-62
N_{41}	BN46	$\alpha_{41} = (8\alpha_{41}(\beta_0) + 2\alpha_{41}(\beta_1) +$ $2\alpha_{41}(\beta_2) + 2\alpha_{41}(\beta_3))/14$	4-63
N_4	BN47	$\alpha_4 = (14\alpha_{41} + 3\alpha_{42})/17$	4-64
N_5	BN51	$\alpha_5 = (FAO6 + 6{}^*CTG + KAO3)/8$	4-65

II. Direct Addition of Ratings with Weightings.

This method attempts to widen the psychological distances between the first three or four choices ranked by the subjects by introducing a formula to adjust the ratings of the first three or four item responses ranked before the above N(R) equations are operated. The under-lying idea of this method is that, very often, some of or all of the ratings of the first three or four choices get tied and it becomes necessary to adopt a consistent method to discriminate them.

Consider a MDT item asking subjects to rank their first three choices:

1st Choice = X_h with rating Y_h

2nd Choice = X_i with rating Y_i

3rd Choice = X_j with rating Y_j

These ratings are adjusted by the following formula:

New ratings = $Y_h' = Y_h - 0.75$

$$Y_i' = Y_i - 0.50 \qquad (4\text{-}66a)$$

$$Y_j' = Y_j - 0.25$$

The general adjusting formula is:

New rating = Old rating $- \dfrac{(r-S+1)}{r+1}$

$$= \text{Old rating} - (1 - \frac{S}{r+1}) \qquad (4\text{-}66b)$$

where   r = no. of ranks asked

S = rank of the choice.

Take an example:

An item of 6 X_is, all are rated as strongly YES
with 1st Choice = X_3, 2nd Choice = X_2, 3rd Choice = X_5

	Original Rating	New Rating
X_1	2	2
X_2	2	2 - 0.50 = 1.50
X_3	2	2 - 0.75 = 1.25
X_4	2	2
X_5	2	2 - 0.25 = 1.75
X_6	2	2

The new ratings are obviously more discriminative and
they are generated based on the subject's own responses.

For MDT item with 4 ranks:

1st Choice = X_h with rating Y_j
2nd Choice = X_i " " Y_i
3rd Choice = X_j " " Y_j
4th Choice = X_k " " Y_k

New ratings are: $Y_h' = Y_h - (1 - \frac{1}{4+1}) = Y_h - 0.80$

$$Y_i' = Y_i - 0.60$$

$$Y_j' = Y_j - 0.40$$

$$Y_k' = Y_k - 0.20$$

III. Ranking Scoring Method

The first 3 or 4 ranks of each MDT item, hypothesized by the theory established, are used as criteria for scoring the ranking data.

TABLE 4.12: First 3 of 4 Ranks of the T.H.R. of MDT Items.

	1st	2nd	3rd	4th	5th
A Lost Bag	X_3	X_2	X_4		
The Sinking Boat	$\{X_4 =$	$X_9^*\}$	X_5	X_8	X_2
A Doctor's Dilemma	X_2	$\{X_3 =$	$X_4 =$	$X_5\}$	
Car Accident	X_1	X_6	$\{X_4 =$	$X_7\}$	
The Criminal	S_2	S_1	$\{S_3 =$	$S_5\}$	S_4
The Young Robber	$\{X_3 =$	$X_8^*\}$	X_4	X_2	X_5
Freedom of Speech	$\{X_1 =$	$X_2\}$	X_6		
Bank Robbery	$\{X_4 =$	$X_8\}$	$\{X_3 =$	$X_7\}$	
Civil War	X_3	X_1	$\{X_2 =$	$X_5\}$	

Notes: 1. X_is marked with an asterisk are for married sub-
jects only. For unmarried subjects (who are sup-
posed to leave these X_is blank), these X_is are
not counted.

2. If $\{X_i = X_j\}$ then "X_i then X_j" or "X_j then X_i" is
regarded as correct. In other words, the rank
orders of the X_is in the bracket $\{\quad\}$ are regarded
as equal.

For the item "the Criminal", the test instruction of the ranking section in Part I has been proved to be too complicated for a large number of subjects. A lot of inconsistent ranking data in this item has been found. It is therefore decided that the rating instead of the ranking are used for scoring. Let S1 to S5 denote the Situations 1 to 5 respectively, define:

$$S1 = X_1 + X_2 + X_3$$
$$S2 = X_5 + X_6 + X_7$$
$$S3 = X_9 + X_{10} + X_{11} \qquad (4\text{-}68)$$
$$S4 = X_{13} + X_{14} + X_{15}$$
$$S5 = X_{16} + X_{17} + X_{18}$$

$$S6 = (S2 + S1)\ /2$$
$$S7 = (S3 + S5)/2 \qquad (4\text{-}69)$$

In Eq. (4-7), it is hypothesized that

$$S2 < S1 < \{S3,\ S5\} < S4$$
$$S6 < S7 < S4 \qquad (4\text{-}70)$$

Three ratings (acquaintance, best friend, brother or sister) instead of one (Best friend) in each situation one used to order to give better discriminative effect.

The Ranking Scoring Method consists of the following steps:

(i) Disregarding the order of the ranks, each X_i correctly ranked as one of the 1st 3(or 4) ranks is given a score of 1.

(ii) For 3-choices MDT item, a "bonus" score of 1 is given if the first 2 ranks are correctly placed in order.

(iii) For 4-choices item:

1st 3 ranks correctly placed in order, additional score = 2

1st 2 ranks correctly placed in order, additional score = 1

(iv) A special scoring criterion is used for the item "The Criminal":

S6 < S7 < S4   Score = 3

S6 < {S7 = S4}   Score = 2   (i.e. S6 < S7, S6 < S4 & S7=S4)

S6 < S4 < S7   Score = 1

All other combinations Score = 0

The sum of all the ranking scores in a MDT will give a new score called Consistency (C) Score. C-Score expresses the degree of consistency of the subject's rankings/ratings with our T.H.R. Since our T.H.R. is constructed from the perspective of a high N subject, high C-Scores may be interpreted as high N people.

4.4.2. Part II.

(a) J-Score generated by Ranking Data

Let J_i = Hypothetical Moral Judgment level of Part II statements where i = 2, 3, 4, 5/6.

Without loss of generality, we write J_5 to denote $J_{5/6}$ (i.e. J_5 or J_6 in its original meaning).

A criterion for scoring:

RANK	SCORE
1 (Most Important)	3
2 (2nd Most Important	2
3 (3rd Most Important)	1

For "Civil War" (Long Version):

Rank	1	2	3	4	5
Score	5	4	3	2	1

(i) Define:

S_i = Sum of scores of all J_i statements ranked as one of the top 3 important choices (for "Civil War" (Long Version) : top 5 Choices).

In this case, the S_5 score is identical to the "P" score (Principled Morality Score) in Rest's DIT (see Rest's 1979a).

(ii) Define

$$S = 2S_2 + 3S_3 + 4S_4 + 5S_5 \qquad (4-71)$$

The "S" score is the Moral Judgment stage score generated by ranking data.

Let R' = Possible Minimum of S

R'' = Possible Maximum of S,

Approximate

Moral Judgment

Stage
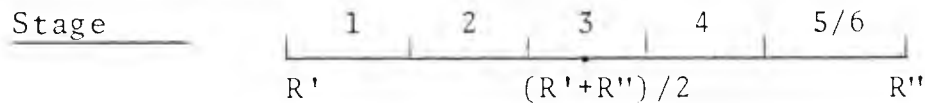
	1	2	3	4	5/6	
R'			$(R'+R'')/2$			R''

(B) J-Score generated by Rating Data.

γ_i = Coefficient of J_i

= The Mean of the subject's ratings of all J_i statements,

where i = 2, 3, 4, 5/6.

(Note: J_5 is defined to include both J_5 & J_6 in this case)

A subject's J-level is given by:

$$J : (\gamma_2, \gamma_3, \gamma_4, \gamma_5)$$

Though the above expression gives more details about the J-level of a subject, it is sometimes more convenient to assign a simplified dominating stage of J to a subject. The following discussion illustrates a simple method for assigning dominating J-stage to a subject.

Assume γ_2 is the largest, a new set of γ_i' is calculated by the following formula:

$$\gamma'_1 = \frac{\gamma_1}{\gamma_2} \times 100$$

$$\gamma'_2 = 100$$

$$\gamma'_3 = \frac{\gamma_3}{\gamma_2} \times 100$$

$$\gamma'_4 = \frac{\gamma_4}{\gamma_2} \times 100$$

In other words, $\gamma'_i = \frac{\gamma_i}{\gamma_k} \times 100$ for $i = 2, 3, 4,$ & 5

and γ_k = the largest of all X_is.

TABLE 4.13: <u>Dominating J-Stage</u>

	2	2(3)	2(1)	2/3	2/1	2(1,3)
$(\gamma'_2 - \gamma'_1)$	k_1	k_1	k_2	k_2	k_3	k_2
$(\gamma'_2 - \gamma'_3)$	k_1	k_2	k_1	k_3	k_2	k_2
$(\gamma'_2 - \gamma'_4)$	k_1	k_1	k_1	k_2	k_2	k_1

Notes:

(i) $k_1 > k_2 >> k_3$.

k_1, k_2 & k_3 are to be fixed or determined empirically.
(For purpose of illustration, say, $k_1 = 50$, $k_2 = 25$, $k_3 = 10$).

(ii) 2(1,3) means that the dominating stage 2 is not clearly
defined in this case; there are two sub-stages, namely
1 & 3.

(iii) The cut-off values, (k_1, k_2, k_3) should be chosen such
that most of the subjects can be assigned a dominating
J-stage by this method.

4.5. Simple MDT Scores

A set of simple MDT scores is contructed based on the subjects ratings

I. Part I Ratings.

Define NR scores as:

$$\alpha\beta 01 = (\alpha_4 + \alpha_5) - (\alpha_1 + \alpha_3) \qquad (4\text{-}72a)$$

$$\alpha\beta 02 = (\alpha_4 + 1.5\,\alpha_5) - (\alpha_1 + 1.5\,\alpha_3) \qquad (4\text{-}72b)$$

$$\alpha\beta 03 = (\alpha_4 + 2\alpha_5) - (\alpha_1 + 2\alpha_3) \qquad (4\text{-}72c)$$

$$\alpha\beta 11 = (\alpha_4 + \alpha_5) \,/\, (\alpha_1 + \alpha_3) \qquad (4\text{-}72d)$$

$$\alpha\beta 12 = (\alpha_4 + 1.5\,\alpha_5) \,/\, (\alpha_1 + 1.5\,\alpha_3) \qquad (4\text{-}72e)$$

$$\alpha\beta 13 = (\alpha_4 + 2\alpha_5) \,/\, (\alpha_1 + 2\alpha_3) \qquad (4\text{-}72f)$$

The reason for putting weightings on α_3 and α_5 is that α_3 is anticipated to be the least discriminative index, therefore a weighting on α_3 is necessary in order to increase the discriminative power of NR scores. In order to balance the weighting assigned to α_3, an equal weighting must be put on either α_4 or α_5. The α_5 is chosen to be weighted so that symmetry in the above equations can be restored.

For MDT Form B, the mean of α_1 and α_2 is taken to be α_1 in the above calculation.

The computer code for $\alpha\beta 01$ to $\alpha\beta 13$ is NR01 to NR13. More details on the computer code of the MDT indices can be found in Appendix 5(F) or Tables 4.10 and 4.11.

II. Part II. Ratings

Define J1, J2, J3, J4 and J5 to be the average ratings of the relevant Part II statements. (See Table 4.6) All statements with Dominant J level at 5, 5B and 6 are used to generate the average rating J5.

Define J-scores as:

$$Y_{01} = (J4+J5) - (J2+J3) \qquad (4-73a)$$

$$Y_{02} = (J4+1.5\,J5) - (J2 + 1.5J3) \qquad (4-73b)$$

$$Y_{03} = (J4+2J5) - (J2+2J3) \qquad (4-73c)$$

$$Y_{11} = (J4+J5) / (J2+J3) \qquad (4-73d)$$

$$Y_{12} = (J4+1.5J5) / (J2+1.5J3) \qquad (4-73e)$$

$$Y_{13} = (J4+2J5) / (J2+2J3) \qquad (4-73f)$$

The computer code for Y_{01} to Y_{13} is RJ01 TO RJ13.

III. Parts I and II as a whole

The following indices are defined by simply adding the NR and RJ indices with appropriate weightings.

```
  NRRJO1 = NRO1 + RJO1
  NRRJO2 = NRO2 + RJO2
  NRRJO3 = NRO3 + RJO3

 WNRRJO3 = NRO1 + 1.5*RJO1
 WNRRJO2 = NRO2 + 1.5*RJO2
 WNRRJO3 = NRO3 + 1.5*RJO3
```

The indices NRRJ11 TO NRRJ13 and WNRRJ11 TO WNRRJ13 are similarly defined. A straightforward derivation of the NRRJ01 and WNRRJ01 indices is illustrated in Appendix 4.

The above indices express a subject's responses to the MDT Parts I and II as a whole.

Finally, it should be noted that not all the scoring methods mentioned in this chapter will be used in the empirical part of this study.

5. The Present Study

The major aim of this research project is to explore a new approach in the study of Moral Development. A theory of Moral Development (hereafter labelled as *TMD) is established in Chapter 3. A new psychological test called the Moral Development Test (MDT) has been constructed and described in Chapter 4.

Broadly speaking, the basic objectives of the present empirical study are as follows:

(1) (a) To validate the test MDT, and

   (b) To test the major theoretical hypotheses of *TMD.

(2) To investigate the characteristics of the MDT in its own right, that is, to investigate the specific features of MDT which are not explicitly described by *TMD.

(3) To perform a cross-cultural study of MDT in two or three countries.

Because of the financial problem and the difficulty in getting subjects, the research strategy was to validate the MDT in London by the author himself. A cross-cultural study was subsequently performed in Hong Kong and Malaysia with the help of his colleagues.

The difficulty in getting subjects to answer a long and personal questionnaire not only made the randomization of the samples impossible but also damaged the original

experimental design considerably. This means that special care must be taken with the generalization of the results and findings reported here at this stage. It should be emphasized that further research is required to substantiate or modify the findings here.

5.1. Hypotheses

I. The Test of Theoretical Hypotheses.

Based on *TMD, a set of hypotheses is proposed. The hypotheses are operationalized in terms of the item responses of MDT form A wherever appropriate in the following discussion. A similar argument can be developed for item responses for the MDT form B.

1 (A). The Hierarchical Structure of Psychological Needs (N) and Human Relationships (R)

The operational hypotheses can be set in terms of:
(i) "N only" (Testing theoretical hierarchy in
                 Section 3.2).
(ii)"R only" (Testing theoretical hierarchy in
                 Section 3.3).
(iii) N(R)   (See Section 4.3).

Since all the item responses in Part I of the MDT and all real situations are more satisfactorily analysed in terms of N(R) structures rather than the "N only" or

"R only" structures, the major analysis here concentrates on N(R) structures.

H.1.1. The X_is in each MDT item when arranged in the order postulated in Section 4.3 show a fixed hierarchical sequence as predicted.

The X_i-patterns of the items "The Sinking Boat" and "Car Accident" can be used to study the R-Hierarchy over a range of N_is. On the other hand, relevant X_is of the item "The Criminal" test the N-Hierarchy at certain fixed R_i. For example, $(X_3, X_7, X_{11}, X_{15}, X_{18})$ tests the N-Hierarchy (in this case, the N varies across different sub-situations (1 to 5) with R_i being fixed at R_1 (brother/sister).

H.1.2. The $\alpha_i(\beta_j)$ indices of $N_i(R_j)$ constructed in Section 4.4 obey a fixed hierarchical sequence as hypothesized.

In this case, the position of $\alpha_1(\beta_j)$ in the sequence is not theoretically predicted because of the complex interaction between empathy, altruism and survival needs (See Section 3.5).

It should be emphasized that the hierarchies described in H.1.1. and H.1.2. are internally structured as discussed in Section 3.2 and 3.3. They are postulated to be true for persons of all ages.

1(B). The Hierarchical Structure of Moral Judgment (J)

It should be noted that the J described here is defined as the Ordinary Level of Judgment while Kohlberg's

J'is referred to as the Optimal Level of Judgment. For their differences, see Section 3.4. Nevertheless, their internal structure is postulated to be similar. As mentioned in section 2.3.3. (See also Kohlberg, 1971, 1976; Colby et. al., in press), this internal structure can only be adequately investigated by longitudinal study; since the present study is a cross-sectional one, no hypothesis regarding the J-structure is made here.

2. The Structure-wholeness of N(R) and J

H.2.1. The N(R)-J structures form   structured wholes.
H.2.2. The N(R) structures form   structured wholes.

Two methods will be used for testing the above hypotheses:

(i) Internal Consistency Reliability

Support of the above hypotheses would require the internal consistency reliability of all the major indices of α (N), β (R), $\alpha(\beta)$ (N(R)) and γ (J) to be reasonably high.

(ii) Factor Analysis

The results of the factor analysis of the above-mentioned major indices should give a consistent picture showing structured-wholeness of N(R) and J.

Another method testing the above hypotheses is the Alternate Form Reliability. However, as the MDT Forms A

and B are not alternate forms, this method cannot be used here (See Section 5.4).

3. The Developmental Nature of N(R) and J.

H.3.1. Individuals develop N(R) according to the pattern postulated in Section 3.2 and 3.3.

H.3.2. Individuals develop J according to the pattern postulated in Section 3.4.

This means that the major $\alpha_i(\beta_j)$ indices and γ scores (for example, the S score mentioned in Section 4.4.2) correlate positively and significantly with age, or show significant trend in the direction of increasing age.

4. The Relationship Between N(R) and J.

H.4. There is a significant positive relation between N(R) and J.

This would mean that the correlation between the major indices of N(R) and the γ-scores should be significant and positive.

5. The Universality of N(R) and J.

H.5. The above hypotheses (H.1.1., H.1.2., H.2.1., H.2.2., H.3.1., H.3.2. and H.4) are true in all cultures.

II. Other Empirical Hypothesis

H.6. There is a positive relation between the major
indices of $N_i(R_j)$ and J_i measured by the MDT and the
scores generated by Kohlberg's MJI and/or Rest's
DIT.

It is expected that the MDT γ-scores bear a stronger
positive relation with the MMS or DIT scores than the major
indices of $N_i(R_j)$. It is argued that $\alpha_i(\beta_j)$ indices are
emotion (or affection) oriented, γ-scores emotion-
rationalization oriented and MMS and DIT scores rational-
ization oriented. Thus, the correlations are probably:

	$\alpha_i(\beta_j)$	γ	MMS/DIT
$\alpha_i(\beta_j)$	—	HIGH	LOW
γ		—	MEDIUM
MMS/DIT			—

At this stage, there is no hypothesis regarding the
effects of sex, intellectual development, personality etc.
on the values of $\alpha_i(\beta j)$ or γ indices. These effects are
to be found empirically.

4.2. Instrumentation and Methods of Scoring

I. Moral Development Test

The details of the MDT construction and its

scoring system are discussed in details in Chapter 4.

(A) English Version

Two forms and four versions of the MDT have been used in the Main Study:

(1) (a) Form A (IS)

    (b) Form A

    (c) Form A+

(2) Form B

The details of MDT Forms A, A+ and B are given in Section 4.1. A copy of the MDT Forms A, B and the item "Civil War" (long version) is given in Appendix 5(A). The MDT Form A(IS) was used only for English Form six subjects. It differs from Form A in a small number of item responses. For details, see Appendix 5(B).

In the data analysis, the sample using Form A(IS) is combined with the samples using Form A with the following arrangement:

(i) Part I item responses.

The X_9 in "The Sinking Boat" of both Forms A(IS) and A is deleted from the analysis. The original X_2 (a highly respected religious leader) in the "Car Accident" of Form A(IS) is also deleted and replaced by X_{10} = a postman.

(ii) Part II statements

The following five statements of Form A(IS) are deleted from analysis: AC03, AC04, BC02, BC05 and DC06.

Only Form A was used extensively in the Main study. Very few work has been done on Form B. ⌐The research strategy is to study Form A thoroughly and uses Form B for studying special topics, for example, the study of α_2 (N_2) and extremely emotional situations (second portion of "Bank Robbery", and "Civil War").

(B) Chinese Version.

When the main study in London was nearly completed, the MDT Form A was translated into Chinese by the author. The translation was checked and refined by two colleagues in London and one in Hong Kong. All of them completed their postgraduate studies in England. They are fluent in both English and Chinese. The Chinese MDT was then used in five Hong Kong (Chinese) samples. Because of a mistake in the printing and the stapling of the Chinese MDT by the author's colleagues in Hong Kong, the first three samples used a Chinese MDT (labelled as Form A(4)*) which is different from the one used by the fourth and fifth samples (labelled as Form A(5)*) in the following aspects:

(i) The order of the items in Form A(4) is exactly the reverse of that in Form A(5). In other words, the order of the items in Form A(4) is:

---

* The number in the bracket refers to the Computer code of the different MDT versions.

"The Criminal", "Car Accident", "A Doctor's
Dilemma", "The Sinking boat" and finally "A
Lost Bag".

(ii) The ranking section of Part I of the item "A
Doctor's Dilemma" was missed in Form A(4) but
not in Form A(5).

The contents of all items in Forms A(4) and A(5)
are the same.

In addition, the contents and test format of the
Chinese MDT Form A(5) are exactly the same as that of the
English MDT Form A except that both the Chinese MDT Forms
A(4) and A(5) do not include the ranking section of Part
I of the item "The Criminal". The reason for dropping
this ranking section in the Chinese MDT is due to the fact
that a lot of young English subjects found particular
difficulty in answering this ranking section.

In the data analysis, it is assumed that the order
of the items in the MDT does not affect the subject's
responses.

A copy of the Chinese MDT Form A(5) is given in
Appendix 5(c).

II. Test Instruments Used in the Validity Study.

1. Kohlberg's Moral Judgment Instrument (MJI)

Form A of Kohlberg's MJI (Colby et. al., 1979)
was used. Instead of interviewing subjects, a written

form of the MJI was used. Subjects were asked to write down their answers in their own words. A copy of the MJI is given in Appendix 5(D). Further details about the characteristics of this test and its scoring method can be found in Section 2.3.3. See also Colby et. al. (1979) and Ma (1980, Appendix B.3).

2. Rest's Defining Issues Test (DIT)

Four stories of Rest's DIT (Rest, 1971a) were used. A copy of the test used is given in Appendix 5(E). The general feature, scoring system and psychometric properties etc. of the DIT are discussed in detail in Section 2.3.5.

It should be noted that the D score is calculated by using a set of empirical weightings which are derived from a Standardized American Sample (Rest, 1979a, p.4.2-4.5). Thus, it has to assume that this set of empirical weightings can be applied to our English sample if the D score is to be calculated. Such assumption is problematic to some extent. The P score will be used more frequently in the discussion.

3. Science Reasoning Tasks (SRT)

The Science Reasoning Tasks are Cognitive Development tests which were "developed by the team 'Concepts in Secondary Maths and Science' at Chelsea College, University of London in the period 1973/78 in order to investigate

the relationship between the optimum Piagetian Level at which a pupil can function and the understanding of Science which he or she can achieve." (Kuchemann, 1979, Task III, p.1) According to the General Guide (Wylam and Shayer, p.8-11), there are seven such tasks. Each task forms a test. Task III: "The Pendulum" of the SRT was used in our study.

In general, a series of short experiments using a simple pendulum were performed in front of the subjects with the help of one or two of the students. The subjects were asked to answer a number of questions after each experiment. All answers were to be written on the test booklet provided. Further details about the test and its scoring system can be found in Kuchemann (1979) and Wylam and Shayer (1980).

4. Raven's Standard Progressive Matrices (RPM) and Junior Eysenck Personality Test (JEPI)

Since both RPM and JEPI are popular psychological tests, their details will not be given here. For a full description of these two tests, see Raven et. al (1978) and S.B.G. Eysenck (1978).

5. Bergling's Thinking Test (TT)

Bergling's Thinking Test is a short multiple choice test constructed based on Piaget's theory. The test

attempts to measure a subject's level of logical thinking
(pre-operational thinking, concrete operational thinking,
formal operational thinking). It consists of 7 items
and each item has 5 choices. Subjects were asked to choose
one of the 5 choices in each item as their answers. They
ususally took about 15 to 20 minutes to complete the test.
Several scoring methods have been studied by Bergling.
The one used here is called the Reasoning Level Test Score.
For further details about the test, see Bergling (1974).

It is remarked here that Bergling (1974) studied
the psychometric properties of his test by using a sample
of primary school children, aged 10 years 0 month to 10
years 11 months. It may be difficult to demonstrate the
developmental property of the test by using a sample of
such narrow age range. Nevertheless, Bergling's study
shows that the test is good for investigating young
children's science thinking ability. In addition, the
test is easy to administer.

5.3. Sample

I. English (London) Sample

All the secondary school subjects used in this
study were drawn from one single school labelled as
School E. The School E had kindly consented to let all
its F.2, F.4 and Lower F.6 pupils participate in our Pilot
or Main Studies. They also provided us some F.3 and a

few Upper F.6 students.

School E is a mixed comprehensive school in London.
It has about one thousand and six hundred pupils, aged
11-18.

On the other hand, our adult sampls in the Main
Study was composed of subjects from different sources:

(i) 29 PGCE (Postgraduate Certificate in Education)
and 4 M.A. (Ed.) students from the Institute of
Education.

(ii) 8 PGCE or undergraduate students from a College
of Education in London.

(iii) 4 M.A. (Medical Sociology) and 6 Undergraduate
students from University of London.

(iv) 3 other persons : a housewife, a clerk and a
secondary school teacher.

All subjects mentioned in this section are
native English or immigrants, unless indicated by an
asterisk "*".

The details of the sample used are given as follows:

(A) Pilot Study

CLASS SEX	F.2	F.4	F.6	ADULTS		
				English	Non-English*	
MALE	20	38	14	8	10	90
FEMALE	8	10	9	8	7	42
	28	48	23	16	17	132

TABLE 5.1. Sample Used in Pilot Study

F.2 (Form Two) and F.4 (Form Four) refer to the Second and Fourth Year Classes respectively in the secondary school. Generally speaking, Lower F.6 and Upper F.6 are approximately equivalent to the Grade 12 and grade 13 (or First Year Undergraduate) respectively in the American Educational System.

17 non-English adults from over 10 countries were added in order to increase the size of the adult sample in the Pilot Study. A total of 132 subjects, 115 of them were English, participated in the Pilot Study.

(B) Main Study

1. Subjects Taking MDT Forms A/A+/A(IS)

TABLE 5.2 Analysis of the London Sample: EDUC BY SEX

SEX	COUNT ROW PCT COL PCT TOT PCT	EDUC FORM TWO 1	FORM THREE 2	FORM FOUR 3	FORM SIX 4	ADULT 5	ROW TOTAL
MALE	1	89 36.2 61.8 19.3	38 15.4 58.5 8.3	65 26.4 49.2 14.1	35 14.2 53.8 7.6	19 7.7 35.2 4.1	246 53.5
FEMALE	2	55 25.7 38.2 12.0	27 12.6 41.5 5.9	67 31.3 50.8 14.6	30 14.0 46.2 6.5	35 16.4 64.8 7.6	214 46.5
	0	0M 0.0 0.0 0.0	0M 0.0 0.0 0.0	0M 0.0 0.0 0.0	2M 0.0 0.0 0.0	0M 0.0 0.0 0.0	2M 0.0
COLUMN TOTAL		144 31.3	65 14.1	132 28.7	65 14.1	54 11.7	460 100.0

Notes:

(1) M = Missing case(s).

(2) The number of missing cases is not included in the Column and Row totals.

TABLE 5.3   Analysis of the London Sample: EDUC BY AGE

EDUC	COUNT ROW PCT COL PCT TOT PCT	AGE 12+ TO 13 YRS 1	13+ TO 14 YRS 2	14+ TO 15 YRS 3	15+ TO 16 YRS 4	16+ TO 17 YRS 5	17+ TO 18 YRS 6	18+ TO 20 YRS 7	20+ TO 22 YRS 8	22+ TO 24 YRS 9	24+ 10	0	ROW TOTAL
FORM TWO 1		63 44.1 100.0 13.8	80 55.9 74.8 17.5	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	1M 0.0 0.0 0.0	143 31.2
FORM THREE 2		0 0.0 0.0	27 41.5 25.2 5.9	38 58.5 46.3 8.3	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	6M 0.0 0.0 0.0	65 14.2
FORM FOUR 3		0 0.0 0.0	0 0.0 0.0	44 33.8 53.7 9.6	85 65.4 98.8 18.6	0 0.0 0.0	1 .8 2.7 .2	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	2M 0.0 0.0 0.0	130 28.4
FORM SIX 4		0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	1 1.5 1.2 .2	19 28.8 100.0 4.1	36 54.5 97.3 7.9	10 15.2 76.9 2.2	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	1M 0.0 0.0 0.0	66 14.4
ADULT 5		0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	3 5.6 23.1 .7	14 25.9 100.0 3.1	15 27.8 100.0 3.3	22 40.7 100.0 4.8	6M 0.0 0.0 0.0	54 11.8
COLUMN TOTAL		63 13.8	107 23.4	82 17.9	86 18.8	19 4.1	37 8.1	13 2.8	14 3.1	15 3.3	22 4.8	4M 0.0	458 100.0

Notes: (1) M = Missing case(s).

(2) The number of missing cases is not included in the Column and Row Totals.

The following remarks should be noted:

(i) The F.6 (Lower Form Six in this case) subjects took MDT Form A(IS). For difference between Forms A(IS) and A, see Section 5.2.

(ii) Most of the English adults (N=50) took Form A^+; only 4 of them took Form A.

(iii) Three groups of F.2 subjects and 4 F.3/4 subjects took both Forms A and B. 23 of them (22 F.2 and one F.4 subjects) took Form A after completing Form B; they are not included in the above sample.

All analyses of MDT (A) are based on the sample described in Table 5.2.

2. Subjects Taking MDT Form B

A total of 94 subjects completed MDT Form B. Table 5.4.1 shows the analysis of the sample. 57 out of the 94 subjects took Form B only or Form B before taking Form A; the details are tabulated in Table 5.4.2. The remaining 37 subjects took Form B after completing Form A, their details are given in Table 5.4.3.

CLASS SEX	F.2	F.3	F.4	
MALE	36	1	23	60
FEMALE	28	0	6	34
	64	1	29	94

TABLE 5.4.1.   Subjects Taking Form B

CLASS SEX	F.2	F.3	F.4	
MALE	18	0	20	38
FEMALE	13	0	6	19
	31	0	26	57

TABLE   5.4.2   Subjects Taking Form B only OR Form B Before Form A.

CLASS SEX	F.2	F.3	F.4	
MALE	18	1	3	22
FEMALE	15	0	0	15
	33	1	3	37

TABLE   5.4.3.   Subjects Taking Form B After Form A.

3. Subjects Taking Both Forms A and B.

	A then B	B then A	
F.2	33	22	55
F.3	1	0	1
F.4	3	1	4
	37	23	60

TABLE 5.5. Subjects Taking Both Forms A & B

The 55 F.2 subjects taking both Forms A and B are used in the study of inter-relation between the two different forms of MDT.

Since the item "Car Accident" appears in both Forms A and B, subjects were normally asked to respond to this item in their first MDT.

(II) Chinese (Hong Kong) Sample

The Chinese subjects were drawn from 5 institutions labelled as C1, C2, C3, C4 and C5.

Schools C1, C2 and C3 are co-education secondary schools. C1 has about 560 pupils and C3 about 1200. The student population of C2 is not known. The academic standard of these three schools is regarded as average.

C4 is classified as a post-secondary college in Hong Kong. It offers courses similar to the university courses in U.K. and America. It has about 3300 students.

C5 is a Catholic secondary school. It admits girls only. The academic standard of the students is regarded as average. The student population of C5 is about one thousand.

CLASS SCHOOL	F.4	F.5	F.6	ADULT	TOTAL
C1	0	75	0	0	75
C2	0	97	0	0	97
C3	31	0	40	0	71
C4	0	0	0	26	26
C5	43	0	0	0	43
	74	172	40	26	312

TABLE 5.6. Chinese (H.K.) Sample

Subjects from C1, C2 and C3 took the Chinese MDT Form A(4) while subjects from C4 and C5 took Form A(5).

Since C5 sample consists of subjects from a girl school, it is decided to excluded it from the major analyses so that the sample used would not be heavily biased with respect to sex. However, this sample is used for studying special topics, for example, the effect of sex on various MDT indices.

Tables 5.7 and 5.8 show further details of the Chinese Sample which consists of subjects from Schools C1, C2, C3 and C4.

TABLE 5.7   Analysis of the Hong Kong Sample: EDUC BY SEX

		SEX COUNT ROW PCT COL PCT TOT PCT	MALE 1	FEMALE 2	0	ROW TOTAL
EDUC						
FORM	FOUR	6	11 40.7 8.7 4.2	16 59.3 11.7 6.1	4M 0 0 0	27 10.3
FORM	FIVE	7	86 50.3 68.3 32.7	85 49.7 62.0 32.3	1M 0 0 0	171 65.0
FORM	SIX	8	20 50.0 15.9 7.6	20 50.0 14.6 7.6	0M 0 0 0	40 15.2
ADULT		9	9 36.0 7.1 3.4	16 64.0 11.7 6.1	1M 0 0 0	25 9.5
		COLUMN TOTAL	126 47.9	137 52.1	6M 0	263 100.0

Notes: (1) M = Missing case(s). The number of missing cases is not included in the Column and Row totals.

TABLE 5.8. Analysis of the Hong Kong Sample: EDUC BY AGE

		AGE COUNT ROW PCT COL PCT TOT PCT	14+ TO 15 YRS 3	15+ TO 16 YRS 4	16+ TO 17 YRS 5	17+ TO 18 YRS 6	18+ TO 20 YRS 7	20+ TO 22 YRS 8	22+ TO 24 YRS 9	24+ 10	0	ROW TOTAL
EDUC												
FORM	FOUR	6	7 28.0 87.5 2.7	14 56.0 26.9 5.4	2 8.0 2.3 .8	1 4.0 1.5 .4	1 4.0 4.5 .4	0 0 0 0	0 0 0 0	0 0 0 0	6M 0 0 0	25 9.6
FORM	FIVE	7	1 .6 12.5 .4	38 22.4 73.1 14.6	71 41.8 80.7 27.3	44 25.9 67.7 16.9	16 9.4 72.7 6.2	0 0 0 0	0 0 0 0	0 0 0 0	2M 0 0 0	170 65.4
FORM	SIX	8	0 0 0 0	0 0 0 0	15 37.5 17.0 5.8	20 50.0 30.8 7.7	5 12.5 22.7 1.9	0 0 0 0	0 0 0 0	0 0 0 0	0M 0 0 0	40 15.4
ADULT		9	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	7 28.0 100.0 2.7	12 48.0 100.0 4.6	6 24.0 100.0 2.3	1M 0 0 0	25 9.6
		COLUMN TOTAL	8 3.1	52 20.0	68 33.8	65 25.0	22 8.5	7 2.7	12 4.6	6 2.3	9M 0	260 100.0

(III) Malaysian Sample

This sample is included here merely for reference purposes. It is a heavily biased sample which consists of students from the top stream. The sample was drawn from three secondary schools in Malaysia, two of them run by Malaysia Government and one by a Catholic Church. Each of the schools has about 1500 to 2000 pupils. Great difficulty was experienced in obtaining subjects in this country.

This is the only sample used here which did not take MDT in their mother language. All subjects in this sample answered the English MDT Form A. All the results and findings concerning this sample will be put in the Appendix 6.6 , except some of the cross-cultural findings which will be put in parallel with the English and Chinese ones in Appendix 6.7.

AGE(Yrs) SEX	17+-18	18+-19	19+-20	20+-21	
MALE	5	22	19	1	47
FEMALE	8	33	6	0	47
	13	55	25	1	94

TABLE   5.9. Malaysian Sample

All subjects are either fourth formers or sixth formers. No information regarding the exact form or class of the subjects was provided.   In addition, five Malaysian adults also took the MDT Form A, their data will be grouped with the 14 non-English adults subjects who participated in our study in London to form a small sample for cross-cultural comparison.

	MDT Forms	Secondary School Subjects	Adult Subjects	
LONDON	Pilot Study	99	16	115
	Main Study (A/A$^+$/A(IS))	408	54	462
	Main Study(B)	57	0	57
Sub-total		564	70	634
HONG KONG	A(4) / A(5)	286	26	312
MALAYSIA	A	94	5	99
OTHER	Pilot Study	0	17	17
	Main Study (A/A$^+$)	10	14	24
TOTAL		954	132	1086

TABLE 5.10. Summary of the Samples

Two school children in the Pilot Study were iden-
tified as immigrants to London but they were included
in our Pilot analysis.

However, since it is not known at this stage whether
there is a cultural effect on the MDT indices or not, we
attempt to use samples of the same or similar cultural
background in our main study. Thus, subjects who emig-
rated recently to London are not included in the main
analysis. There are 10 such new immigrants (3 in F.2,
2 in F.3 and 5 in F.4 classes). In general, these subjects
showed some difficulty in understanding the English-
written questionnaire.

5.4. Pilot Study

Generally speaking, there are three phases in the
production of a MDT:

Phase I: Design of the Test and Item Construction.

A very vague idea of the theoretical model was
developed first.

The ideas for some of the items (e.g., "The Sinking
Boat", "A Lost Bag" and part of "The Criminal") were
formed in the Spring of 1979. With the ideas of these
items in mind, different types of test design and test
format were considered. As the theory developed, it was
decided that the questions for each item should be split

into two parts: the first part asked for decisions or choices and the second part tested judgment. The DIT format was found to be most suitable for the Part II questions. As for Part I, the present format with the use of an algebraic symbol "X" was considered to be the most effective and the least ambiguous; though it was anticipated that subjects at very low stage of cognitive development might require additional explanation or help in the understanding of the test instructions.

When the test format was fixed, more items were then constructed. The presentation of the MDT Part II statements was heavily influenced by Rest's DIT prototypic statements and the Criterion Judgment statements in Colby et. al. (1979).

Phase II: Consulting Subjects

An interview format for each of the potential MDT items was drafted and many people were invited to talk in a free style with the author on some of these items. Eight of them, all postgraduate students at the Institute of Education, were interviewed for at least one hour. They were chosen as the Consulting Subjects, who offered valuable help in the construction of MDT. They discussed with the author their own choices and judgment. In addition, they also gave opinions on the design and contents of the test. On average, each of them spent about $1\frac{1}{2}$ to 2 hours with the author.

On the whole, their discussion was very helpful, for examples, the sub-situation 5 : 'Earthquake' of the item "The Criminal" was constructed from a suggestion by a female subject, and Part I questions of the item "A Doctor's Dilemma" were greatly modified after listening to the opinions of some of the Consulting Subjects.

Eight items were finally constructed and three Pilot forms of the MDT (labelled as PA, PB and PC) were composed, each of them consists of 5 items. An additional item "Civil War" (Long version) was constructed later on; it was added to each of the MDT for adult subjects only.

PA	PB	PC
Car Accident	Car Accident	Car Accident
The Young Robber	The Young Robber	The Young Robber
The Sinking Boat	The Sinking Boat	Freedom of Speech
A Lost Bag	A Doctor's Dilemma	The Sinking Boat
(Civil War)*	(Civil War)*	Bank Robbery
The Criminal	The Criminal	(Civil War)*

* For adult subjects only.

TABLES 5.11 Pilot Forms of the MDT

At that time, it was thought that each of the Pilot forms of the MDT could act as a complete test by itself. three items: "Car Accident", "The Young Robber" and "The Sinking Boat" were regarded as crucial ones; they were supposed to be part of a final MDT. (It turned out to be not)

Phase III: Pilot Study of the MDT

The above three pilot forms of the MDT were tested by 125 subjects . (For details of the sample, see Section 5.3)   Another 7 adult subjects, one English and 6 non-English, were tested with Form A(IS) in the latest stage of the Pilot Study.   Therefore, the total number of subjects used in the whole Pilot study should be 132.

Pilot Form Class	PA	PB	PC	
F.2	28	0	0	28
F.4	10	15	23	48
Lower and Upper F.6	11	12	0	23
Adult*	8	11	7	26
	57	38	30	125

* Another 7 adults took Form A(IS)

TABLE 5.12. Pilot Study of the MDT

All subjects were invited to give their opinion on the design and contents of the test. Only a few adults gave comments but about half of the school-children did write a few lines commenting on the test design or re-counting their feeling about the testing. In addition, small groups of pupils in each class were requested to give their opinions and comments on the test in a short interview with the author.

The data were then computed and a preliminary analysis was carried out. After reviewing the whole situation, some item responses in Parts I and II were deleted or modified. Five items were chosen to form a proper MDT (i.e. Form A(IS) /A) with the item "Civil War" (Long Version) being added for adult subjects only. It was felt strongly that it would be a pity to drop the other three items from the present study. Finally, this dilemma was resolved by composing a second form of the MDT (Note: not an alternate form) by using the further three items, a short version of the item "Civil War" and the item "Car Accident" from Form A. The second form is called Form B. It was decided that Form B would be studied with less than 100 school-children.

5.5. Main Study

I. London Study

Owing to a request from School E, the lower F.6 subjects in the main study had to be tested at a time

about six weeks before the expected date, it was thus ne-
cessary to construct an Intermediate Form of the MDT (i.e
A(IS) for this particular group of subjects because
there was not sufficient time to go through
all the analyses of the Pilot data. The differences
between the Intermediate and Final Forms of the MDT (A)
are described in Section 5.2. Some analyses of the data
of these F.6 subjects were carried out before the final
form was completely constructed, thus the findings of
this sample also contributed to the development of the
final form.

(A) Experimental Design

The original experimental design was constructed
with the purpose to study:

(1) Test-retest reliability of MDT (A)

(2) The relation between the Scores of MDT and those of

    (a) MJI

    (b) DIT

    (c) Science Reasoning Task

    (d) Standard Progressive Matrices

    (e) JEPI

The design also attempted to "randomise" the test
order effect.

However, the following practical problems prevent
the full accomplishment of the whole experimental design
satisfactorily:

(1) Some subjects in one F.3 and two or three F.4 classes were on a study trip to Germany during the first period of the testing sessions.

(2) Classes were not of approximately equal size and the attendance rates of different classes sometimes varied considerably.

(3) Subjects in a few classes were not willing to take the tests.

Nevertheless, the actual experiments did cover a substantial part of the original design.

TABLE 5.13 <u>Experimental Design of London Study</u>

Class/ Group Code	1st Test		2nd Test		3rd Test	
	Code	N	Code	N	Code	N
21	A	24	MJI	15	A	20
22	A	30	RPM	23	A	18
23	A	24	SRT	24		
24	A	13	B	10		
25	A	15				
26	RPM	10	A	15		
27	SRT	23	A	14	B	23
28	MJI	30	B	31	A	22
31	A	25	MJI	15		
32	A	24	RPM	10		
33	MJI	9	A	16		
41	SRT	28	A	28		
42	A	32	A	18		
43	A	13	SRT	7		
44	A	12	MJI	8		
45	RPM	13	A	15		
46	DIT	8	A	14		
47	A	8	RPM	6		
48	A	10				
49	B	17	RPM	11		
40	MJI	4	B	9		
60	A(IS)	67	DIT	26		
81	A-A+	4-28	DIT	2-25		
82	DIT	22	A+	22		

The following notes apply to Table 5.13:

(1) All the symbols and notations used are explained in Appendix 5(F). For easy reference, the details of the Class/Group Code are listed as follows:

Class/Group Code	Meaning
21 to 28	F.2 Classes
31 to 33	F.3 Classes
40 to 49	F.4 Classes
60	F.6 Class
81-82	Adult Sample

(2) "1st Test" means the first test taken by the subjects. It usually lasted for one and a half class period (1 class period = 35 minutes). Those who did not appear in the first testing period but appeared in the second and third (or fourth for some F.2 classes) periods were asked to join the group for the 2nd/3rd tests only. Therefore, it is possible that the N for the 2nd or 3rd test in some classes are larger than the N for the 1st test.

(3) Though most of the data described in Table 5.13 are good for analysis, a few of them have to be discarded because of large amount of missing data. The actual N being analysed will be given alongside with the results and findings.

TABLE 5.14. Validity Study using the London Sample described in Table 5.2

TEST CODE \ CLASS	F.2	F.3	F.4	F.6	Adult	
MJI	15	24	8	0	0	47
DIT	0	11	46	26	49	132
SRT	31	0	35	0	0	66
RPM	28	10	19	0	0	57
JEPI	66	31	56	0	0	153
TT	7	0	22	0	0	29

(B) Experimental Procedures

B.1.   School E

(1) Four classes of F.2 (21, 22, 27 and 28) were given
    two Double periods (1 period = 35 minutes), the whole
    F.6 group was given one Double period and all the
    rest were given three periods (either one Double
    plus one Single, or three Single periods). The
    time interval between two successive testing periods
    was normally one week.

(2) Before the testing, the class teachers were con-
    sulted. Information on the characteristics and
    general academic standard of the class was provided.
    The class teachers were given a copy of the test
    and were told how the test would be administered.

(3) The teacher introduced the author or his colleague
    to the class at the start of the testing and read
    the following introduction;

            "A group of researchers from the University
            of London Institute of Education are trying
            to find out what opinions young people have
            about some social situations. That is, how
            you would act or do things when you have
            decisions to make where other people are
            concerned.

            You may wonder why they are doing a study

            like this. One reason is to compare replies

            from young people from different countries

            (Britain, Hong Kong and Malaysia); young

people who may have quite different back-

grounds from you.

They want to carry out this study quite

confidentially so that you can feel quite

free in giving your replies."

The teacher and the researcher also answered
any questions asked by the students. Then the teacher
went through the whole test instructions with the class
in detail.

(4) Subjects were not compelled to complete the tests.
On the whole, less than 10% of them showed reluctance
to complete the tests.

(5) In general, there was no strict time limit for
completing any of the tests. A few of them who did
not complete the major parts of the tests are dropped
from the sample.

(6) Some of the subjects in Class 33 and all the F.6
subjects were allowed to take the tests home for
completion. F.6 subjects only took DIT home. All
other subjects in School E completed the tests during
their class periods.

(7) F.2, F.3 and F.4 subjects were given the JEPI or TT
if they finished the assigned tests before the end
of the time allocated. Similarly, some of the F.3
and F.4 subjects were given the DIT if there were

plenty of time left.

(8) Classes 21, 22 and 42 were used for studying test-retest reliability.

B.2. Adult Subjects

It was found that it was extremely difficult to ask adults to fill in such a long and personal questionnaire. Only a small number of them were willing to do so.

Subjects were given a written introduction and two tests (MDT Form A^+/A and DIT) with clear instructions for completing which test first. Except eight subjects, all of them took the tests home, completed them and re-turned to us. The return rate was estimated to be about 25%.

(C) Practical Problems

(1) Classes 25 (N = 15) and 47 (N = 8) were described by their teachers as classes of very low academic ability. Some of them could not read properly. They were given additional help in the understanding of the test ins-tructions and the meaning of the test contents. These two classes were asked to answer only Part I of the MDT. Since their number is so small, they are also included in the major sample.

(2) While most of the subjects exhibited a high degree

of good conduct and co-operation, a few of them did
show disciplinary problems. It should be emphasized
that many of these unwilling subjects showed reluc-
tance only in the last testing period, most probably
because they felt bored at being tested for such a
long time. According to the testing record, the
testing atmosphere of the following testing sessions
was rated as bad:

Class	Test
21	Retesting of MDT (A)
25	MDT (A)
32	RPM
48	MDT (A)
40	MJI and MDT (B)

The above data were anticipated to have much more
noise than the rest and thus some of these data may have
to be discarded completely.