6. Results

Generally speaking, there are four major factors affecting the results and findings of a study: (1) the theory, (2) the empirical design and methodology, (3) the method of analysis and (4) the quality of the data, that is, whether there is lots of "noise" in the data or not; the "noise" in the present study refers to missing data, faking responses and/or technical inconsistencies such as the rate-rank inconsistencies.

The discussion here concentrates on factor (4) only. It is difficult to provide a scientific method for assessing the quality of the data. In other words, it is difficult to set scientific criteria for rejecting data from any analysis. The basic rules used here in dealing with this problem are as follows:

(1) All criteria for rejecting data must apply to all subjects.

(2) Objective criteria should be used as far as possible.

(3) Whenever subjective criteria are used, they should be used for rejecting data before the data have been analysed. For example, decisions on whether to reject those subjects who were suspected of giving faking responses or copying answers from other, must be made before the data have been analysed to avoid any improper manipulation of data. On the other hand, the exploration of objective criteria for rejecting data is to be done in the actual computation and analysis of the data.

(4) Rejecting criteria are set with the principle of using as much data as possible without introducing too much "noise" into the results.

(5) As far as possible, individual subject rather than a whole class/group should be the unit for rejection. A whole class/group can only be discarded if the testing atmosphere of the class/group is bad. Any such case will be reported in some details and, in some important cases, the result of the analysis of the data including the rejected class/group will be given in an appendix for reference.

6.1. Rejecting Criteria

I. Missing Data in Ratings

There are many ways for handling missing data, but, all of them damage the elegance of the analysis and may also distort the results and findings in some cases. It is important that the criterion for rejecting subjects should be carefully developed.

Different methods are used for treating missing data in ratings and those in rankings. This section focuses on the discussion of treating missing data in ratings. In the next section, the method for handling missing data in rankingswill be explored. (Since most of the analyses are on the MDT Form A, the discussion here only deals with missing data in the MDT Form A. A similar method can be developed for handling missing data in MDT Form B)

In order to allow subjects who missed only a small number of item responses to be analysed, the values of the subjects' major MDT indices (CTA TO CTE, N16, N36, N415, N51, JI TO J5) are adjusted for missing data. For the rest of the MDT indices, only those which are composed of five or more item responses are adjusted for missing data. If the value of an index is not adjusted for missing data, then any missing data concerned with that index would result in a total rejection of that index being analysed or computed by the SPSS. The method for adjusting missing data in an index is by dividing the sum of the relevant item responses by the number of non-missing item responses, with missing data automatically excluded by the computer program.

Two major set of Rejecting Criteria are adopted by using the following SPSS "REJECT IF" operation

MDT	CODE	REJECTING CRITERIA
Part I	RC-I-1	REJECT IF (MN16 EQ 0 OR MN36 EQ 0 OR MN415 EQ 0 OR MN51 EQ 0
	RC-I-2	REJECT IF (MCTALL LE 43 OR MN16 LE 6 OR MN36 LE 11 OR MN415 LE 27 OR MN51 LE 4)
Part II	RC-II-1	REJECT IF (MJ2 EQ 0 OR MJ3 EQ 0 OR MJ4 EQ 0 OR MJ5 EQ 0)
	RC-II-2	REJECT IF (MJALL LE 37 OR MJ2 LE 2 OR MJ3 LE 7 OR MJ4 LE 9 OR MJ5 LE 12)

TABLE 6.1. Rejecting Criteria for MDT(A)

The explanation of the computer codes (e.g MN16, Mn36 etc.) can be found in Appendix 5(F).

The meanings of above rejecting criteria are as follows:

(1) MDT Part I

RC-I-1: A case is rejected if any of the major N-indices (N16, N36, N415 or N51) is zero.

RC-I-2: A case is rejected if more than 4 item responses in total or more than 2 item responses in each of the major N-indices (N16, N36, N415 and N51) are missing.

(2) MDT Part II

For all MDT(II) analysis, the Rejecting Criteria for the MDT(I) also apply.

RC-I-1 and RC-II-1: A case is rejected if any of the major N or J-indices (N16, N36, N415, N51, J2 TO J5) is zero.

RC-I-2 and RC-II-2: A case is rejected if more than 4 item responses in Parts I or II, or more than 2 item responses in each of the major N or J-indices (N16, N36, N415, N51, J2 TO J5) are missing.

It is obvious that RC-I-2 and RC-II-2 are much stricter than RC-I-1 and RC-II-1. The advantage of using RC-I-1 and RC-II-1 is that the data are being used maximally and thus the analyses are less sophisticated in some sense. However, this method tends to introduce more "noise" into the results and findings than the method using RC-I-2 and RC-II-2. In general, most of the analyses are carried out with RC-I-2/RC-II-2.

In addition, some of the analyses are done by using the common SPSS methods for treating missing data, for example, Listwise deletion in RELIABILITY, and Pairwise deletion in PEARSON CORR. (See SPSS manual by Nie et. al., 1975, and Revised Manuals issued by Vogelback computing Centre, Northewestern University in 1976 and 1977).

II. Missing data in Rankings and Rate-Rank Inconsistencies.

RC-I-3: Rejecting Criterion for MDT Part I.

The ranking data of a case is rejected if

(1) the subject's ratings do not pass the appropriate Rejecting Criterion: RC-I-1 or RC-I-2,

(2) more than 1 ranking in each of the situations or more than 2 rankings in total are missing,

(3) the subject's item responses do not pass the Rate-Rank Consistency check.

The Rate-Rank Consistency check is a method for treating ranking data, which is used in Rest's DIT research (Rest, 1979a, p.3.4-3.5). The details of this method are described clearly by the Computer Program (See Appendix 6.1) In short, if an item response is given the top rank, its rating must also be at the top, that is, towards the "Definitely YES" in Part I or the "Very Great Importance" in Part II. The Rate-Rank Consistency check in Part I only deals with the first 3 rankings in four of the five situations, with "The Criminal" being excluded. (See also Section 4.4.1). The Criterion used is:

> A case is rejected if there are more than 6 errors in a single situation and/or more than 2 stories with inconsistencies.

RC-II-3: Rejecting Criterion for MDT Part II.

The ranking data of a case is rejected if

(1) the subject's ratings do not pass the appropriate Rejecting Criterion: RC-I-1 and RC-II-1, or RC-I-2 and RC-II-2, (in order to reduce the amount of computation, only the RC-I-2 and RC-II-2 will be studied in this case)

(2) more than 1 ranking in each of the situations or more than 2 rankings in total are missing

(3) the subject's item responses do not pass the following Rate-Rank Consistency Check:

The first two rankings of each situation are checked and a case is rejected if there are more than 6 errors in a single situation and/or more than 2 stories with inconsistencies.

(4) a subject rates the same number of the scale more than 7 times in more than one situation. The last criterion is based on Rest's (1979a, p.3.5) argument. It is argued that if a subject rates the same number of the scale too many times, he/she is suspected of not answering the questionnaire properly and therefore should be rejected.

The following table shows the number of subjects rejected by using different Rejection Criteria:

Table 6.2 Rejecting Criteria Applied to the English (London) Sample.

		MDT: Part I			MDT: Part II		
		Ratings		Rankings	Ratings		Rankings
		RC-I-1	RC-I-2	RC-I-3	RC-I & II-1	RC-I & II-2	RC-I & II-3
F.2 N=144 (Part I only)	No. Accepted	144	132	98	-	-	-
	(%)	(100)	(91.7)	(68.1)	-	-	-
	No. Rejected	0	12	46	-	-	-
	(%)	(0)	(8.3)	(31.9)	-	-	-
F.3 N=65	No. Accepted	65	62	52	65	60	39
	(%)	(100)	(95.4)	(80.0)	(100)	(92.3)	(60.0)
	No. Rejected	0	3	13	0	5	26
	(%)	(0)	(4.6)	(20.0)	(0)	(7.7)	(40.0)
F.4 N=132	No. Accepted	132	126	109	124	112	91
	(%)	(100)	(95.5)	(82.6)	(100)	(90.3)	(73.4)
	No. Rejected	0	6	23	0	12	33
	(%)	(0)	(4.5)	(17.4)	(0)	(9.7)	(26.6)
F.6 N=67	No. Accepted	67	66	46	67	63	35
	(%)	(100)	(98.5)	(68.7)	100	(94.0)	(52.2)
	No. Rejected	0	1	21	0	4	32
	(%)	(0)	(1.5)	(31.3)	(0)	(6.0)	(47.8)

Table 6.2 (Continued)

		MDT: Part I			MDT: Part II		
		Ratings		Rankings	Ratings		Rankings
		RC-I-1	RC-I-2	RC-I-3	RC-I & II-1	RC-I & II-2	RC-I & II-3
Adult N=54	No. Accepted	54	52	42	54	48	41
	(%)	(100)	(96.3)	(77.8)	(100)	(88.9)	(75.9)
	No. Rejected	0	2	12	0	6	13
	(%)	(0)	(3.7)	(22.2)	(0)	(11.1)	(24.1)
Total I:N= 462 II:N= 318	No. Accepted	462	438	347	310	283	206
	(%)	(100)	(94.8)	(75.1)	(100)	(91.3)	(66.5)
	No. Rejected	0	24	115	0	27	104
	(%)	(0)	(5.2)	(24.9)	(0)	(8.7)	(33.5)

TABLE 6.3

Rejecting Criteria Applied to the Chinese (Hong Kong) Sample

		MDT: (I)			MDT: (II)		
		RATINGS		RANKINGS	RATINGS		RANKINGS
		RC-I-1	RC-I-2	RC-I-3	RC-II-1	RC-II-2	RC-II-3
F.4 N=31	No.Accepted	31	30	20	31	25	15
	(%)	(100)	(96.8)	(64.5)	(100)	(80.7)	(48.4)
	No.Rejected	0	1	11	0	6	16
	(%)	(0)	(3.2)	(35.5)	(0)	(19.3)	(51.6)
F.5 N=172	No.Accepted	172	172	144	172	169	149
	(%)	(100)	(100)	(83.7)	(100)	(98.3)	(86.6)
	No.Rejected	0	0	28	0	3	23
	(%)	(0)	(0)	(16.3)	(0)	(1.7)	(13.4)
F.6 N=40	No.Accepted	40	39	36	40	38	36
	(%)	(100)	(97.5)	(90.0)	(100)	(95.0)	(90.0)
	No.Rejected	0	1	4	0	2	4
	(%)	(0)	(2.5)	(10.0)	(0)	(5.0)	(10.0)
Adult N=26	No.Accepted	26	25	24	26	25	24
	(%)	(100)	(96.2)	(92.3)	(100)	(96.2)	(92.3)
	No.Rejected	0	1	2	0	1	2
	(%)	(0)	(3.8)	(7.7)	(0)	(3.8)	(7.7)
Total N=269	No.Accepted	269	266	224	269	257	224
	(%)	(100)	(98.9)	(83.3)	(100)	(95.5)	(83.3)
	No.Rejected	0	3	45	0	12	45
	(%)	(0)	(1.1)	(16.7)	(0)	(4.5)	(16.7)

The following notes apply to TABLES 6.2 and 6.3:

(1) The English (London) Sample refers to the Sample described in Table 5.2. The details of the Chinese (Hong Kong) Sample is described in Table 5.7.

(2) Abbreviation used:

'No. Accepted' means 'number of subjects accepted for the analysis' and its percentage in each sub-group is given in bracket. Similarly, 'No. Rejected' means 'number of subjects rejected from the analysis' and its percentage in each sub-group is also given in bracket.

III. Unwilling Subjects and Faking Responses

On average, less than 10% of the school-children present in the test sessions showed unwillingness to complete the MDT. However, as mentioned before, a few classes did have a bad testing atmosphere (See Section 5.5). All subjects who did not complete all the five MDT items were rejected from all the analysis, even though they had completed other tests (e.g. MJI, DIT and SRT) satisfactorily. In other words, subjects were allowed to miss a few item responses in any of the MDT dilemma but not all in any single MDT dilemma.

In addition, if subjects were suspected of giving faking responses or attempting to copy responses from neighbours, their data were discarded. For MDT, less

than 5 such cases were discarded. However, for tests of intellectual ability like RPM, the situation was quite bad in some classes. For example, in class 32, about half of the class were not doing the RPM properly; they either discussed their answers with their classmates or copied answers from others. About half of the RPM data in Class 32 were discarded. Except for one or two cases (e.g. the Class 21 in the study of Test-retest Reliability), individual subjects instead of a whole class were considered for rejection from analysis. The details of each particular case will be given alongside with the results and findings.

6.2. London Study: MDT Form A (English Version)

6.2.1. Reliability of the MDT.

I. Test-Retest Reliability.

Three classes (21, 22 and 42) were used in the study of test-retest reliability of the MDT Form A. Classes 21 and 22 only took Part I of the test. The time interval between the tests for Classes 21 and 22 was 14 days and that for Class 42 was 20 days.

There have been two problems in this study:

(1) After taking the first MDT and MJI (on average, it took 45 minutes to complete a MDT or MJI in F.2 classes),

some subjects in class 21 were unwilling to be re-tested for the MDT. The testing atmosphere was regarded as bad and some subjects had to be persuaded to complete the second MDT. It is believed that a substantial part of the data of the second MDT in this class are unreliable. The whole group is discarded for test-retest reliability study here. However, the test-retest reliability analysis of this class is given in Appendix 6.2(A).

(2) A preliminary analysis of the test-retest reliability of class 42 led to a low correlation between the first MDT (Part II) and second MDT (Part II). Refined analysis revealed that one of the subjects in this class showed an extremely opposite rating pattern in the Part II of his first and second MDT. It is decided that two sets of the test-retest reliability analysis should be given; one set excluding this particular subject is presented here, the other set including this subject is given in Appendix 6.2(B).

TABLE 6.4(A) Test-Retest Reliability: MDT Part I.

CLASS CODE / MDT INDEX	22 (N=18)		42 (N=18)		22 & 42 (N=36)	
CTA	0.349		0.783	***	0.670	***
CTB	0.885	***	0.781	***	0.846	***
CTC	0.574	**	0.679	***	0.648	***
CTD	0.460	*	0.694	***	0.588	***
CTE	0.733	***	0.750	***	0.746	***
Average CT	0.600	na	0.737	na	0.700	na
N16	0.872	***	0.617	**	0.787	***
N36	0.811	***	0.928	***	0.892	***
N415	0.758	***	0.794	***	0.786	***
N51	0.465	*	0.726	***	0.637	*
Average N	0.727	na	0.766	na	0.776	na
NRO1	0.743	***	0.815	***	0.822	***
NRO2	0.671	***	0.860	***	0.829	***
NRO3	0.617	**	0.884	***	0.831	***
NR11	0.791	***	0.847	***	0.843	***
NR12	0.724	***	0.869	***	0.835	***
NR13	0.679	***	0.883	***	0.829	***
Average NR	0.704	na	0.860	na	0.832	na

TABLE 6.4(B): Test-Retest Reliability: Class 42 (N=18)

I. MDT Part II

	r	P		r	P
J1	0.687	***	RJ01	0.643	**
J2	0.865	***	RJ02	0.620	**
J3	0.816	***	RJ03	0.613	**
J4	0.719	***	RJ11	0.724	***
J5	0.706	***	RJ12	0.686	***
Average J	0.759	na	RJ13	0.655	**
			Average RJ	0.657	na

II. MDT: NRRJ and WNRRJ indices

	r	P		r	P
NRRJ01	0.935	***	WNRRJ01	0.942	***
NRRJ02	0.952	***	WNRRJ02	0.955	***
NRRJ03	0.957	***	WNRRJ03	0.958	***
NRRJ11	0.938	***	WNRRJ11	0.942	***
NRRJ12	0.944	***	WNRRJ12	0.952	***
NRRJ13	0.943	***	WNRRJ13	0.942	***
Average NRRJ	0.945	na	Average WNRRJ	0.949	na

The following notes apply to Tables 6.4(A) and 6.4(B):

(1) Significance: * $P \leq 0.05$ ** $P \leq 0.01$
*** $P \leq 0.001$ na = not applicable

(2) The average value of each set of MDT indices is calculated merely for convenience of discussion. They may not be statistically meaningful.

(3) The NRRJ and WNRRJ indices are linear combinations of NR

and RJ indices. (See Appendix 4.) Since the range of NR indices is 1.5 times that of RJ indices, the WNRRJ indices use a weighting of 1.5 for RJ indices in order to balance this difference. The NRRJO1 and WNRRJO1 are defined here for convenience. Full details are given in the above-mentioned appendix.

NRRJO1 = NRO1 + RJO1

WNRRJO1 = NRO1 + 1.5 * RJO1

(4) Rejecting Criteria used: RC-I-2 for Part I.
and RC-I-2 & I-2 for Part II.

II. Internal Consistency Reliability

The coefficient alpha (See e.g. Thorndike and Hagen, 1977, p.82) is used in the study of the internal consistency reliability of the MDT. The emphasis is on studying the internal consistency of the MDT Part I and II as a whole. Each of the major MDT indices (N16, N36, N415, N51, J2 to J5) is treated as a variable or score in the following discussion unless otherwise specified. The internal consistency of the whole MDT is expressed by the coefficient alpha of the NRRJ indices which are linear combinations of the above 8 MDT indices. The method for estimating the reliability of a weighted sum of scores is based on Nunnally (1978, p.246-251).

Consider a score/variable y which is expressed in terms of a weighted sum of scores X_is:

$$\Gamma_{yy} = 1 - \frac{\Sigma\, b_i^2\, \sigma_i^2 - \Sigma\, b_i^2\, \sigma_i^2\, \Gamma_{ii}}{\sigma_y^2}$$

where σ_i^2 = variance of the variable X_i

b_i = weight for variable X_i

σ_y^2 = variance of the variable y

Γ_{ii} = reliability of the variable X_i

In addition, the standard error of measurement (See e.g. Thorndike and Hagen, 1977, p.85-87; Nunally, 1978, p.239-234) of the MDT indices are also given.

Two important points about the internal consistency reliability study of the MDT are as follows:

(1) It is argued that the internal consistency reliability of the whole MDT (Parts I and II together) is much more important and meaningful than that of its parts. While the MDT Part I is likely to form an independent whole, Part II is less likely to be; this is because the answers given in Part II are supposed to be highly dependent on the answers in Part I.

(2) In order to study the internal consistency reliability properly, only subjects who have completed <u>all</u> the item responses will be entered into the analysis. In addition, since the F.6 subjects answered the MDT Form A(IS) which is slightly different from the MDT Form A, all the F.6 subjects are excluded from the following internal consistency study.

TABLE 6.5 Internal Consistency Reliability of the MDT: London Study (N=146)

A. Treating the N and J-indices as variables/scores

	Γ	σ_i	σ_{meas}
N16	0.874	1.122	0.399
N36	0.698	0.722	0.397
N415	0.930	1.013	0.268
N51	0.499	0.814	0.576
J2	0.405	0.681	0.525
J3	0.629	0.595	0.362
J4	0.578	0.525	0.341
J5	0.548	0.442	0.297
NRRJO1	0.833	2.924	1.195
NRRJO2	0.812	3.511	1.522
NRRJO3	0.794	4.155	1.886
Average NRRJ	0.813	na	na
WNRRJO1	0.792	3.25	1.482
WNRRJO2	0.784	3.92	1.822
WNRRJO3	0.807	4.66	2.047
Average WNRRJ	0.794	na	na

B. Treating the NRJ indices as variables/scores.

	Γ	σ_i	σ_{meas}		Γ	σ_i	σ_{meas}
NRJ2	0.787	0.762	0.352	WNRJ2	0.737	0.809	0.415
NRJ3	0.775	0.589	0.279	WNRJ3	0.776	0.691	0.327
NRJ4	0.918	0.780	0.224	WNRJ4	0.907	0.818	0.250
NRJ5	0.451	0.381	0.283	WNRJ5	0.475	0.503	0.365
NRRJO1	0.961	2.924	0.577	WNRRJO1	0.955	3.25	0.689
NRRJO2	0.957	3.511	0.728	WNRRJO2	0.950	3.92	0.877
NRRJO3	0.953	4.155	0.901	WNRRJO3	0.945	4.66	1.093
Average NRRJ	0.957	na	na	Average WNRRJ	0.950	na	na

Notes:

(1) The sample used in the above internal consistency reliability study consists of 36 F.3, 72 F.4 and 38 adult subjects. The total N = 146.

(2) Rejecting Criteria used:

REJECT IF (MCTALL LT 48 OR MJALL LT 42)

(3) $\sigma_{meas} = \sigma_i\sqrt{1-\Gamma}$

where

σ_{meas} = standard error of measurement

σ_i = standard deviation

Γ = reliability coefficient, which refers to the coefficient alpha in this study.

(4) In (B), the coefficient alpha of each NRRJ indice is calculated by treating each of the following four NRJ indices as a variable or score:

NRJ2 = N16 + J2
NRJ3 = N36 + J3
NRJ4 = N415 + J4
NRJ5 = N51 + J5

Similarly, the coefficient alpha of each WNRRJ indice is calculated by treating each of the following four WNRJ indices as a variable or score:

WNRJ2 = N16 + 1.5 * J2
WNRJ3 = N36 + 1.5 * J3
WNRJ4 = N415+ 1.5 * J4
WNRJ5 = N51 + 1.5 * J5

A weighting of 1.5 is given to each of the J indices in order to increase their ranges. See also note (3) in Table 6.4 and Section 4.5.

(5) It is emphasized here that the average reliability of NRRJ or WNRRJ indices is calculated merely for the convenience of discussion. They may not be satisti-cally meaningful.

In addition, the internal consistency reliability of the CT-indices and the MDT Part I as a whole is also studied by using 370 subjects who have completed all the item responses in Part I. The results are tabulated in Appendix 6.2 (C). The internal consistency reliability of the MDT Part II as a whole is studied by using the same sample (N = 146) described in Note (1) of Table 6.5. The results are given in Appendix 6.2 (D).

6.2.2 Qualitative Analysis of the MDT Part I Item Responses

In order to sketch out the response patterns of the MDT Part I item responses in each Situation (or Dilemma), the means of the rating of each item response for each of the following groups: F.2, F.3, F.4, F.6 and adult groups are plotted in Figure 6.1 (A to E). The points are joined by straight lines for illustrative purpose. This kind of qualitative method of analysis is of course not statistically elegant but it gives an overall picture of the MDT Part I response patterns.

The MDT Part II item responses are not plotted in the similar way. However, the means and standard deviations of the rating of each Part II item response for the sample group of 283 subjects are given in Appendix *6.2 (E)* in Microfiche (1).

The following notes apply to Figure 6.1 (A to E):

(1) The order of the X_is follows directly the corresponding theoreticl hierarchical order postulated in Section 4.3.1.
(2) Rejecting Criteria used: RC-I-2 for the F.2 group; RC-I-2 & RC-II-2 for the F.3, F.4, F.6 and adult groups.
(3) Number of subjects: F.2 (N = 132), F.3 (N = 60), F.4 (N = 112), F.6 (N = 63) and Adult (N = 48).
(4) Horizontal axis: X_is
Vertical axis: Average rating (1 = Definitely YES to 7 = Definitely NO)
(5) There is no data on BA09 (i.e. X_9 in Figure 6.1 (B)) in the F.6 group because they took the MDT Form A(IS) which does not consist of this item response. It should be noted that subjects who were not married were asked not to answer the BA09 item, but many of them have ignored this instruction. The mean of this item response is plotted here for matter of interest.

Figure 6.1 (A) A Lost Bag

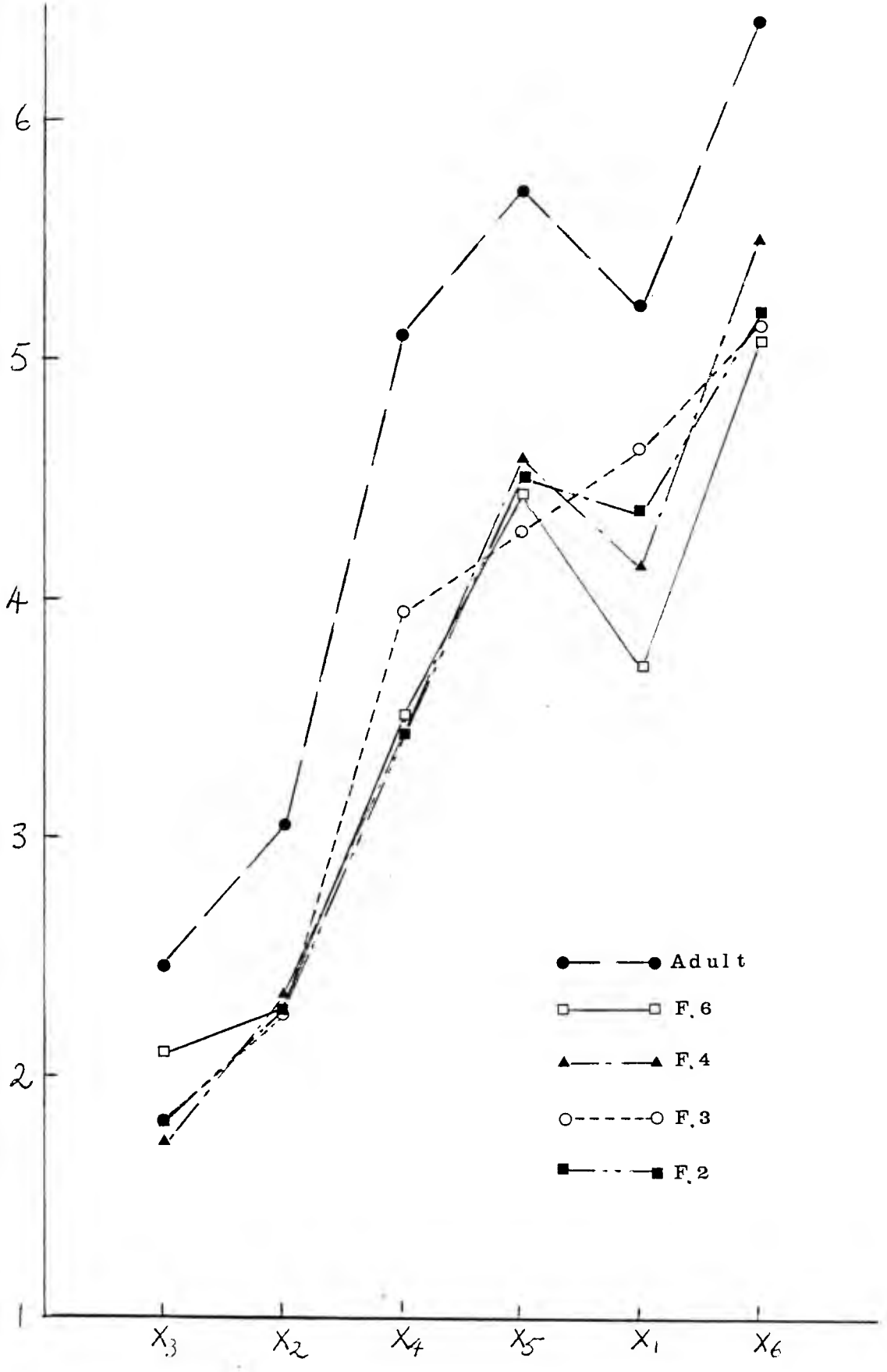


Figure 6.1 (B) The Sinking Boat

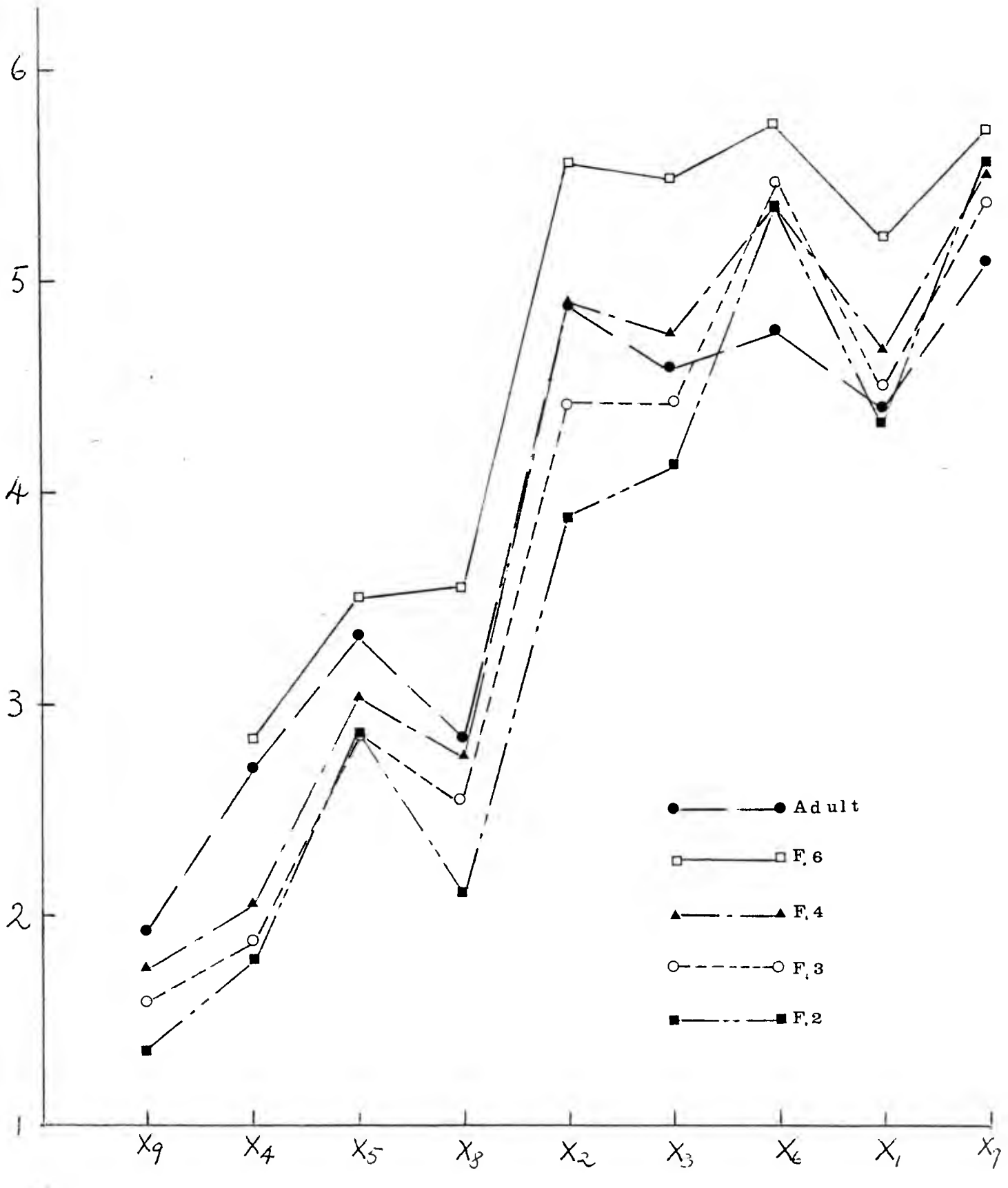


Figure 6.1 (C) A Doctor's Dilemma

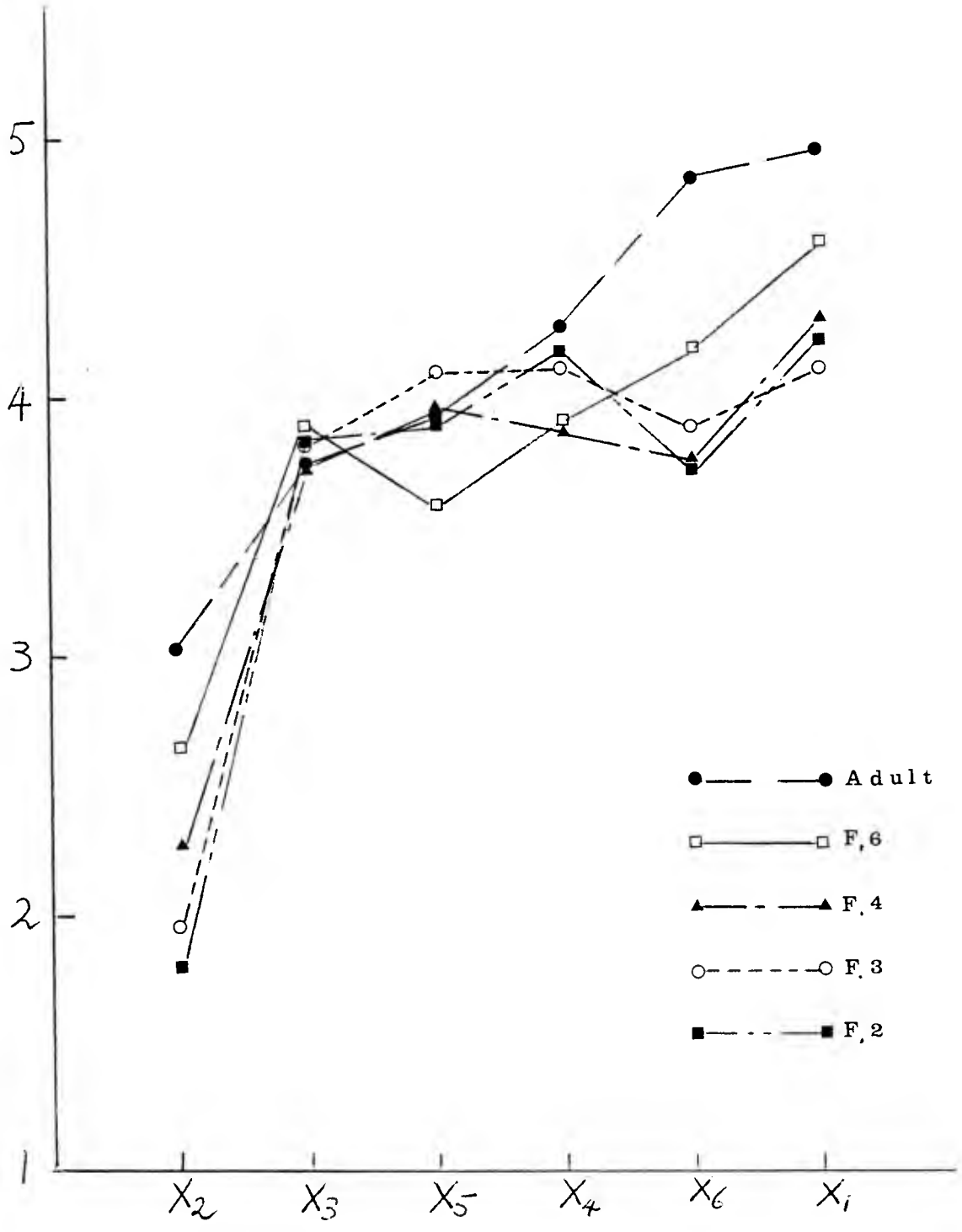


Figure 6.1 (D) Car Accident

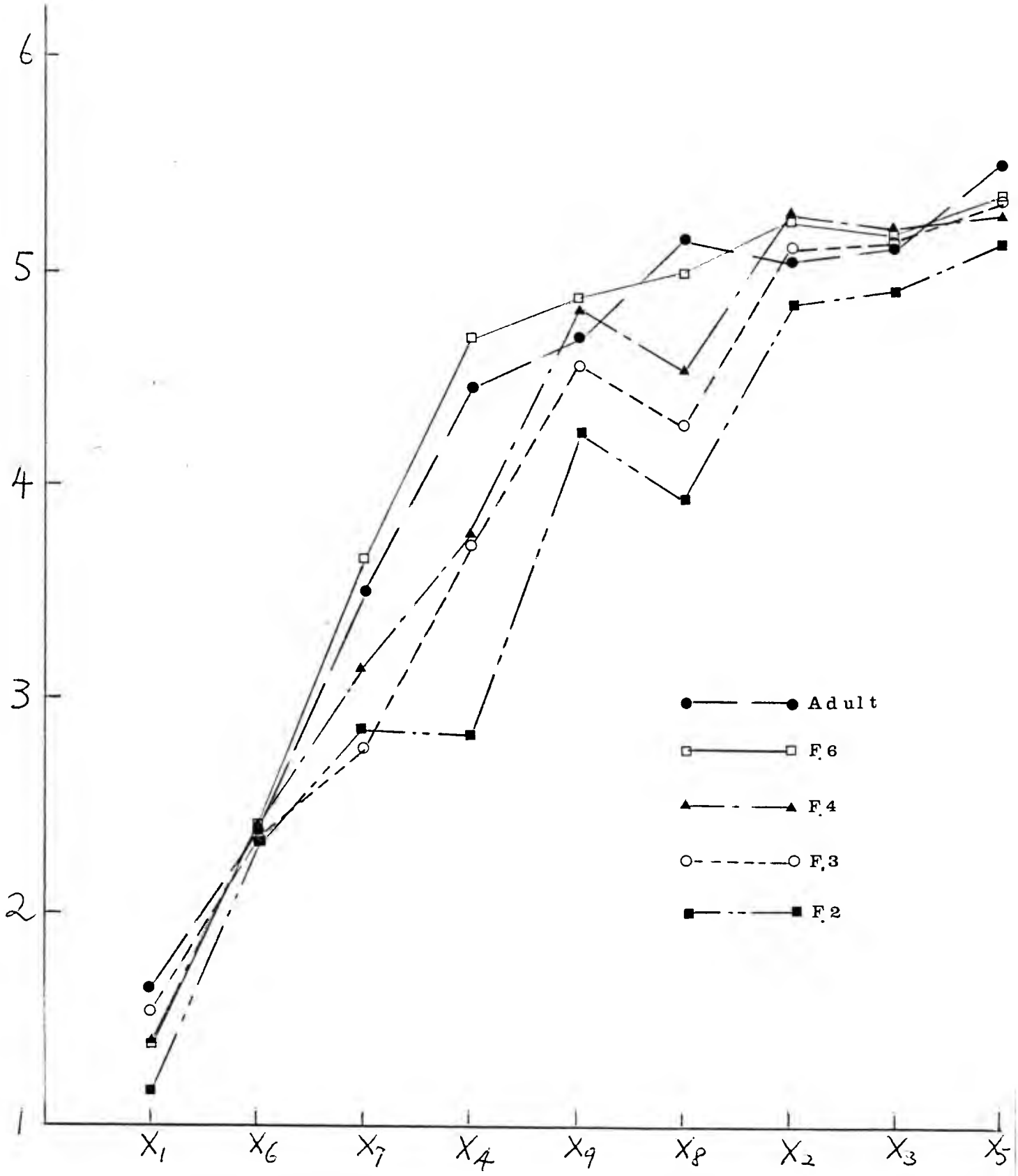
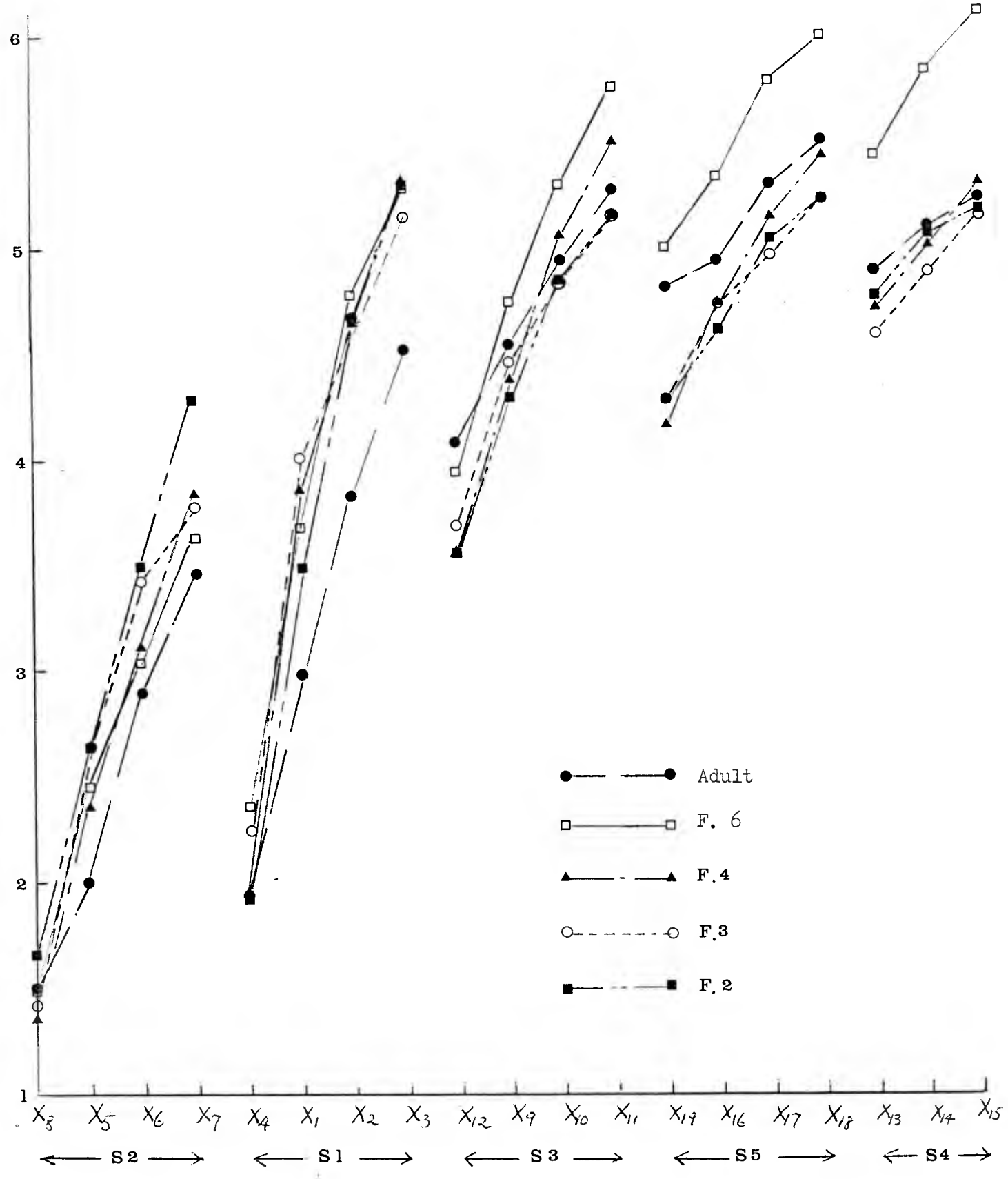


Figure 6.1 (E) The Criminal



6.2.3 The Hierarchical Order of the N-indices

I. The Means of Some Important N-indices

Three graphs showing the means of each of the following N-indices for each of the five sample groups: F.2, F.3, F.4, F.6 and adult group are drawn:

(1) N16, N36, N415, N51. (i.e. α_1, α_3, α_4, α_5)

(2) N31, N32, N33. (i.e. $\alpha_{31}(\beta_1)$, $\alpha_{31}(\beta_2)$, $\alpha_{31}(\beta_{41})$)

(3) N428, N429, N426, N427 (i.e. $\alpha_{41}(\beta_1)$, $\alpha_{41}(\beta_2)$, $\alpha_{41}(\beta_3)$, $\alpha_{41}(\beta_{43})$).

TABLE 6.6 The Means and Standard Deviations of Some Important N-indices.

	F.2		F.3		F.4		F.5		F.6	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
N16	4.09	1.00	3.77	1.16	3.76	1.11	3.18	1.25	3.95	1.41
N36	2.52	0.64	2.76	0.78	2.79	2.72	2.96	0.81	3.17	0.78
N415	4.17	0.71	4.22	1.17	4.21	0.90	4.58	0.93	3.95	1.02
N51	4.66	0.82	4.53	0.84	4.58	0.87	4.56	0.90	4.09	0.92
N31	1.57	0.68	1.72	0.78	1.73	0.76	2.06	0.85	2.31	0.84
N32	2.60	1.03	2.61	1.21	2.74	1.01	2.95	1.15	2.85	1.15
N33	2.94	1.22	3.76	1.28	3.70	1.43	4.65	1.38	4.02	1.22
N428	5.26	1.21	5.16	1.59	5.28	1.32	5.49	1.18	4.78	1.49
N429	4.43	1.03	4.43	1.60	4.37	1.20	4.79	1.25	3.99	1.32
N426	3.95	0.97	4.05	1.50	3.99	1.27	4.40	1.25	3.82	1.29
N427	2.83	1.15	2.86	1.34	2.72	1.07	3.23	1.19	3.05	1.24

Notes:

(1) The sample consists of 132 F.2, 62 F.3, 126 F.4, 66 F.6 and 52 Adult Subjects. The total N = 438.

(2) Trend analysis and other refined analysis of the above N-indices are given in latter sections.

Figure 6.2 The order of the means of some important N - indices: London Study

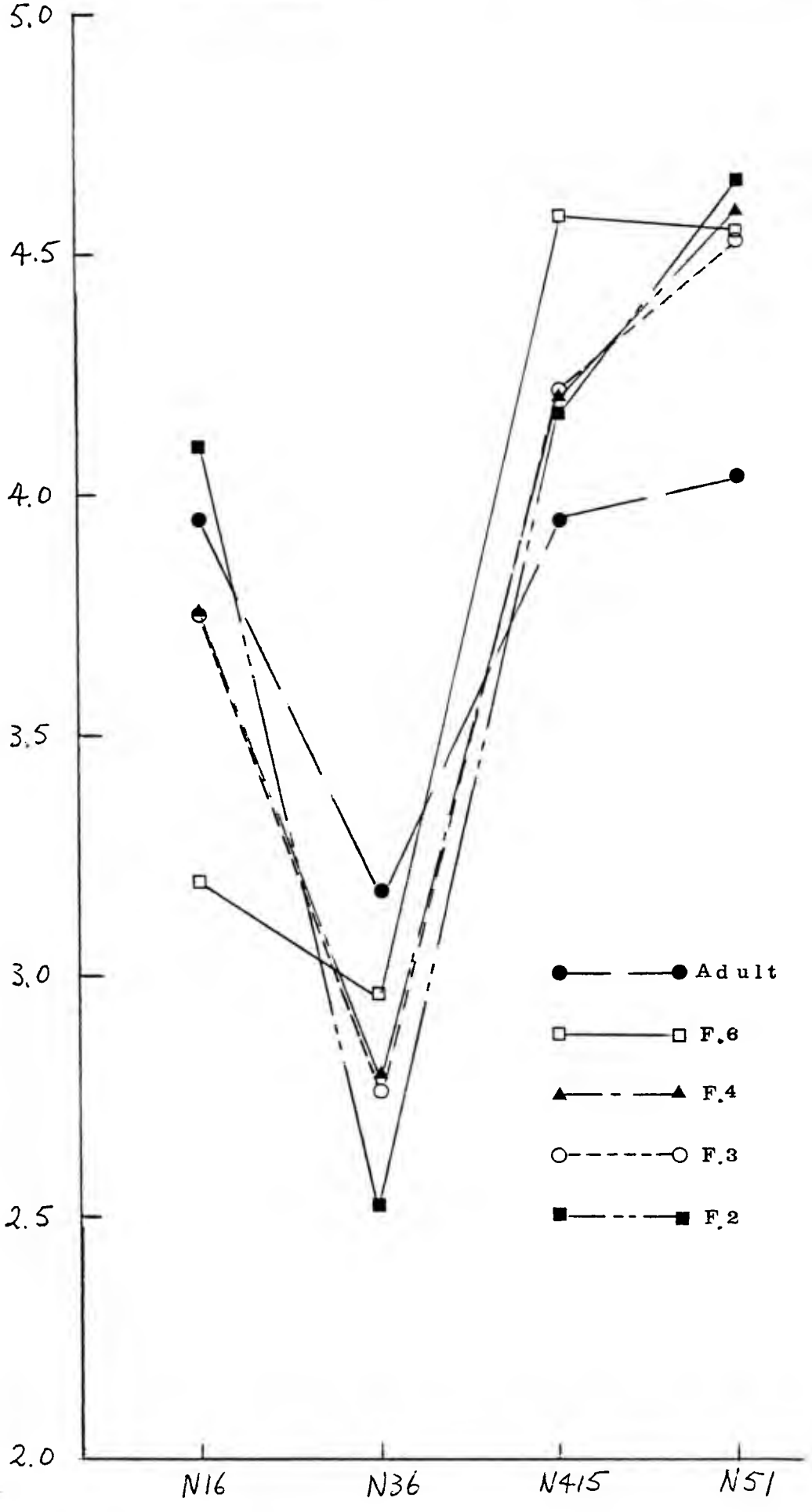
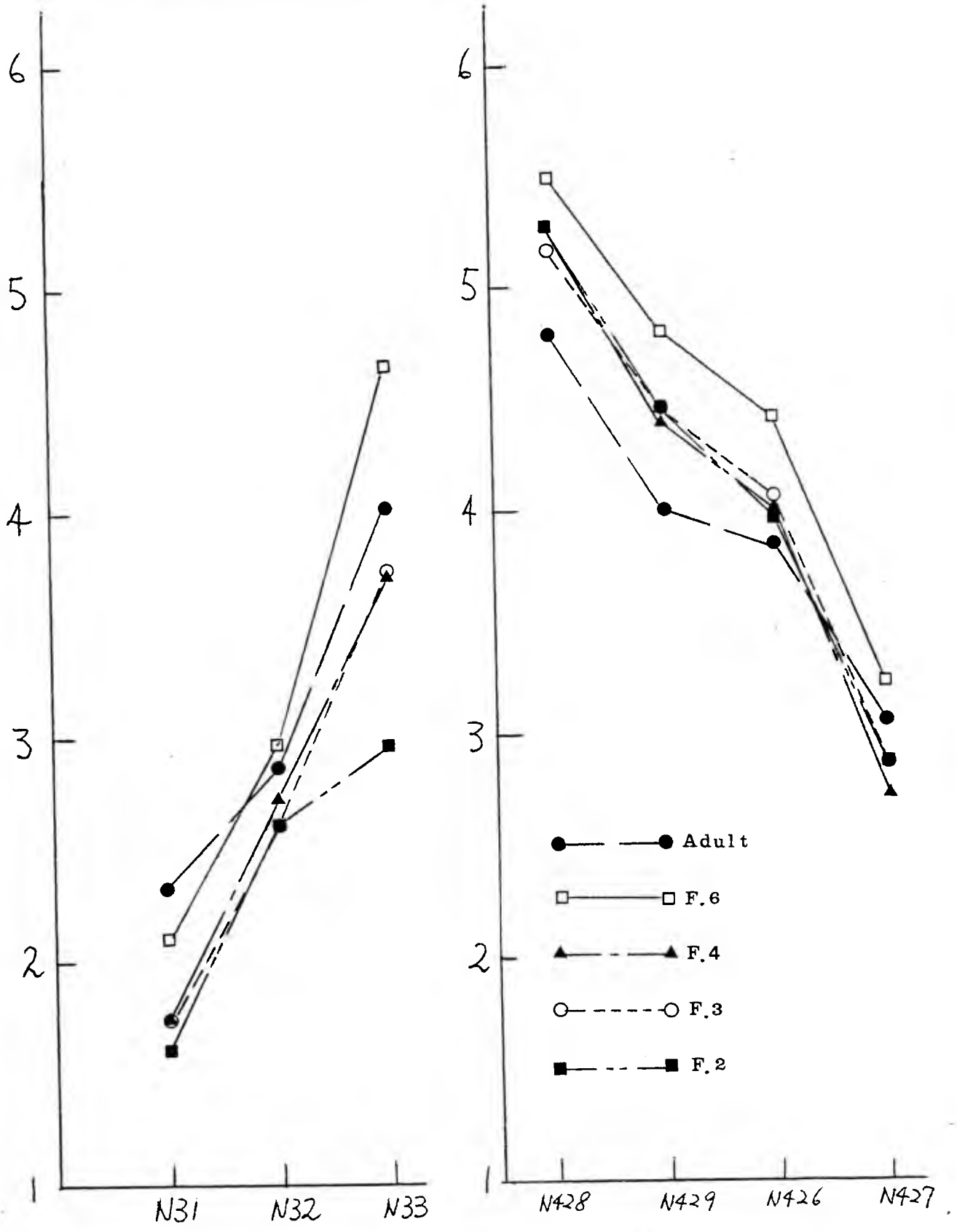


Figure 6.2 (Continued)



II. The Order of the N-indices.

In order to simplify the following explanation, the SPSS language and the Computer Coding System (See Appendix 5(F) and SPSS manual) are used. The orders of the ratings of the relevant N-indices are expressed by the scores SNO1 to SNO3.

(1) The order of N36, N415, N51

```
COMPUTE          SNO1 = 0
IF               (N36 LE N415) SNO1 = SNO1 + 1
IF               ((N36 LE N415) AND (N415 LE N51))
                 SNO1 = SNO1 + 1
```

(2) The order of N31, N32, N33.

```
COMPUTE          SNO2 = 0
IF               (N31 LE N32) SNO2 = SNO2 + 1
IF               ((N31 LE N32) AND (N32 LE N33))
                 SNO2 = SNO2 + 1
```

(3) The order of N428, N429, N426, N427

```
COMPUTE          SNO3 = 0
IF               (N428 GE N429) SNO3 = SNO3 + 1
IF               ((N428 GE N429) AND (N429 GE N426))
                 SNO3 = SNO3 + 1
IF               ((N428 GE N429) AND (N429 GE N426)
                 AND (N426 GE N427)) SNO3 = SNO3 + 1
```

To illustrate the operation of the above computing procedure, consider case (1):

(a) if N36 is less than or equal to N415, the score SNO1 is given one unit.

(b) if N36 is less than or equal to N415 and N415 is less than or equal to N51, the score SNO1 is given one additional unit.

The following tables show the cross-tabulation of SNO1 to SNO3 by EDUC (five sample groups).

TABLE 6.7 SN - Analysis: The Order of Some N Indices

SN01

EDUC		0	1	2	ROW TOTAL
1 FORM TWO	COUNT	11	43	78	132
	ROW PCT	8.3	32.6	59.1	30.1
	COL PCT	18.3	24.9	38.0	
	TOT PCT	2.5	9.8	17.8	
2 FORM THREE	COUNT	10	26	26	62
	ROW PCT	16.1	41.9	41.9	14.2
	COL PCT	16.7	15.0	12.7	
	TOT PCT	2.3	5.9	5.9	
3 FORM FOUR	COUNT	14	53	59	126
	ROW PCT	11.1	42.1	46.8	28.8
	COL PCT	23.3	30.6	28.8	
	TOT PCT	3.2	12.1	13.5	
4 FORM SIX	COUNT	9	33	24	66
	ROW PCT	13.6	50.0	36.4	15.1
	COL PCT	15.0	19.1	11.7	
	TOT PCT	2.1	7.5	5.5	
5 ADULT	COUNT	16	18	18	52
	ROW PCT	30.8	34.6	34.6	11.9
	COL PCT	26.7	10.4	8.8	
	TOT PCT	3.7	4.1	4.1	
COLUMN TOTAL		60	173	205	438
		13.7	39.5	46.8	100.0

SN02

EDUC		0	1	2	ROW TOTAL
1 FORM TWO	COUNT	17	46	69	132
	ROW PCT	12.9	34.8	52.3	30.1
	COL PCT	29.3	46.5	24.6	
	TOT PCT	3.9	10.5	15.8	
2 FORM THREE	COUNT	9	10	43	62
	ROW PCT	14.5	16.1	69.4	14.2
	COL PCT	15.5	10.1	15.3	
	TOT PCT	2.1	2.3	9.8	
3 FORM FOUR	COUNT	13	31	82	126
	ROW PCT	10.3	24.6	65.1	28.8
	COL PCT	22.4	31.3	29.2	
	TOT PCT	3.0	7.1	18.7	
4 FORM SIX	COUNT	7	8	51	66
	ROW PCT	10.6	12.1	77.3	15.1
	COL PCT	12.1	8.1	18.1	
	TOT PCT	1.6	1.8	11.6	
5 ADULT	COUNT	12	4	36	52
	ROW PCT	23.1	7.7	69.2	11.9
	COL PCT	20.7	4.0	12.8	
	TOT PCT	2.7	.9	8.2	
COLUMN TOTAL		58	99	281	438
		13.2	22.6	64.2	100.0

SN03

EDUC		0	1	2	ROW TOTAL
1 FORM TWO	COUNT	26	9	97	132
	ROW PCT	19.7	6.8	73.5	30.1
	COL PCT	23.4	56.3	31.2	
	TOT PCT	5.9	2.1	22.1	
2 FORM THREE	COUNT	16	1	45	62
	ROW PCT	25.8	1.6	72.6	14.2
	COL PCT	14.4	6.3	14.5	
	TOT PCT	3.7	.2	10.3	
3 FORM FOUR	COUNT	32	3	91	126
	ROW PCT	25.4	2.4	72.2	28.8
	COL PCT	28.8	18.8	29.3	
	TOT PCT	7.3	.7	20.8	
4 FORM SIX	COUNT	17	2	47	66
	ROW PCT	25.8	3.0	71.2	15.1
	COL PCT	15.3	12.5	15.1	
	TOT PCT	3.9	.5	10.7	
5 ADULT	COUNT	20	1	31	52
	ROW PCT	38.5	1.9	59.6	11.9
	COL PCT	18.0	6.3	10.0	
	TOT PCT	4.6	.2	7.1	
COLUMN TOTAL		111	16	311	438
		25.3	3.7	71.0	100.0

6.2.4 Factor Analysis of the Major MDT indices

The SPSS FACTOR Program with VARIMAX rotation was used in the following analysis:

(1) N16, N36, N415, N51 (Number of factors studied = 2)

(2) J2 TO J5 (Number of factors studied = 2)

(3) N16, N36, N415, N51, J2 TO J5 (Number of factors studied = 3)

Rejecting Criteria used are RC-I-2 and RC-II-2 and N = 283. More factor analyses of the major MDT indices are given in Appendix 6.2(F).

TABLE 6.8 Principal Component Analysis: N16, N36, N415, N51, J2, J3, J4, and J5 Indices

VARIABLE	MEAN	STANDARD DEV	CASES
N16	3.6547	1.1985	283
N36	2.8858	.7648	283
N415	4.2631	.9860	283
N51	4.4584	.9678	283
J2	3.0185	.7169	283
J3	2.7482	.5915	283
J4	3.3656	.5266	283
J5	2.8762	.4989	283

TABLE 6.8 (Continued)

CORRELATION COEFFICIENTS..

	N16	N36	N415	N51	J2	J3	J4	J5
N16	1.00000	-.33340	-.33387	-.35426	.01298	.08205	-.15556	-.18508
N36	-.33340	1.00000	-.52564	-.02132	.18062	.41770	-.03569	.20162
N415	-.33387	-.52564	1.00000	.10824	-.04180	-.22300	.24943	.04795
N51	-.35426	-.02132	.10824	1.00000	-.03917	-.36190	-.14395	-.02681
J2	.01298	.18062	-.04180	-.03917	1.00000	.25400	.28062	.21645
J3	.08205	.41770	-.22300	-.36190	.25400	1.00000	.34309	.38572
J4	-.15556	-.03569	.24943	-.14395	.28062	.34309	1.00000	.43252
J5	-.18508	.20162	.04795	-.02681	.21645	.38572	.43252	1.00000

FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
1	2.22757	27.8	27.8
2	1.76874	22.1	50.0
3	1.44028	18.0	68.0
4	.87109	10.9	78.8
5	.68108	8.5	87.4
6	.47555	5.9	93.3
7	.41579	5.2	98.5
8	.11990	1.5	100.0

FACTOR MATRIX USING PRINCIPAL FACTOR, NO ITERATIONS

	FACTOR 1	FACTOR 2	FACTOR 3
N16	-.07692	-.68582	.58401
N36	.59674	-.24100	-.69612
N415	-.29167	.79499	.33340
N51	-.35014	.39333	-.58131
J2	.51713	.11298	.07172
J3	.81813	-.15925	.11458
J4	.54926	.51928	.38327
J5	.64764	.38185	.01953

VARIABLE	COMMUNALITY
N16	.81734
N36	.89876
N415	.82824
N51	.61523
J2	.28533
J3	.70783
J4	.71823
J5	.56563

TABLE 6.8 (Continued)

VARIMAX ROTATED FACTOR MATRIX
AFTER ROTATION WITH KAISER NORMALIZATION

	FACTOR 1	FACTOR 2	FACTOR 3
V16	-.22477	.02160	-.87541
V36	.27471	.86346	.27880
V415	.14526	-.84073	.31673
V51	-.27316	-.03337	.73450
J2	.51927	.11715	-.04433
J3	.68150	.39577	-.29453
J4	.78441	-.32068	-.00993
J5	.73470	.04131	.15537

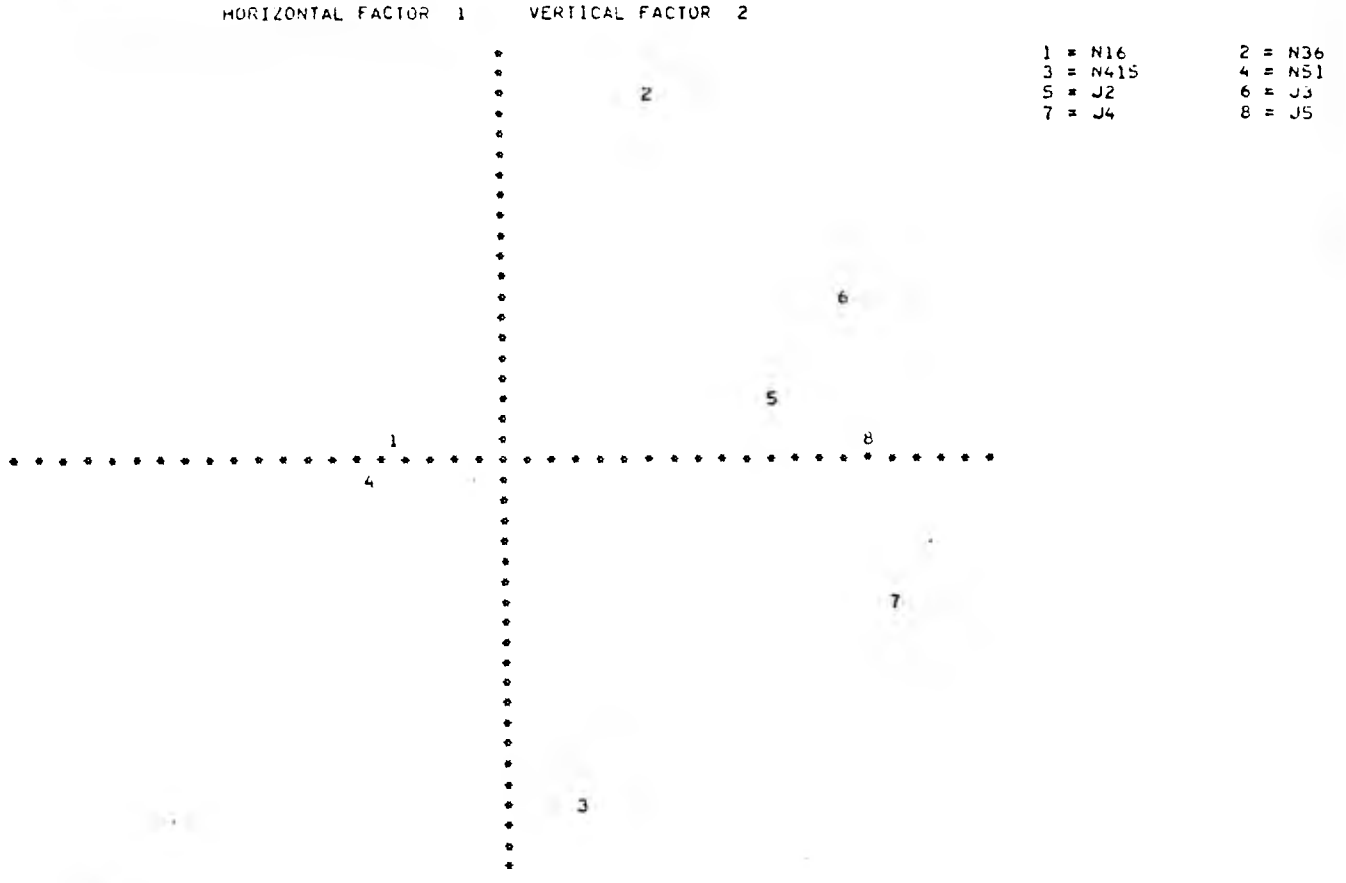
TRANSFORMATION MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
FACTOR 1	.68314	.45138	-.12775
FACTOR 2	.41498	-.62471	.66146
FACTOR 3	.21877	-.63718	-.73902

FACTOR SCORE COEFFICIENTS

	FACTOR 1	FACTOR 2	FACTOR 3
V16	-.10270	-.03172	-.55173
V36	.07430	.51400	.23283
V415	.12153	-.46739	.14296
V51	-.13483	.04730	.46545
J2	.24242	.03316	-.02420
J3	.30440	.17134	-.16527
J4	.39781	-.24166	-.03396
J5	.34933	-.01230	.09561

TABLE 6.8 (Continued)



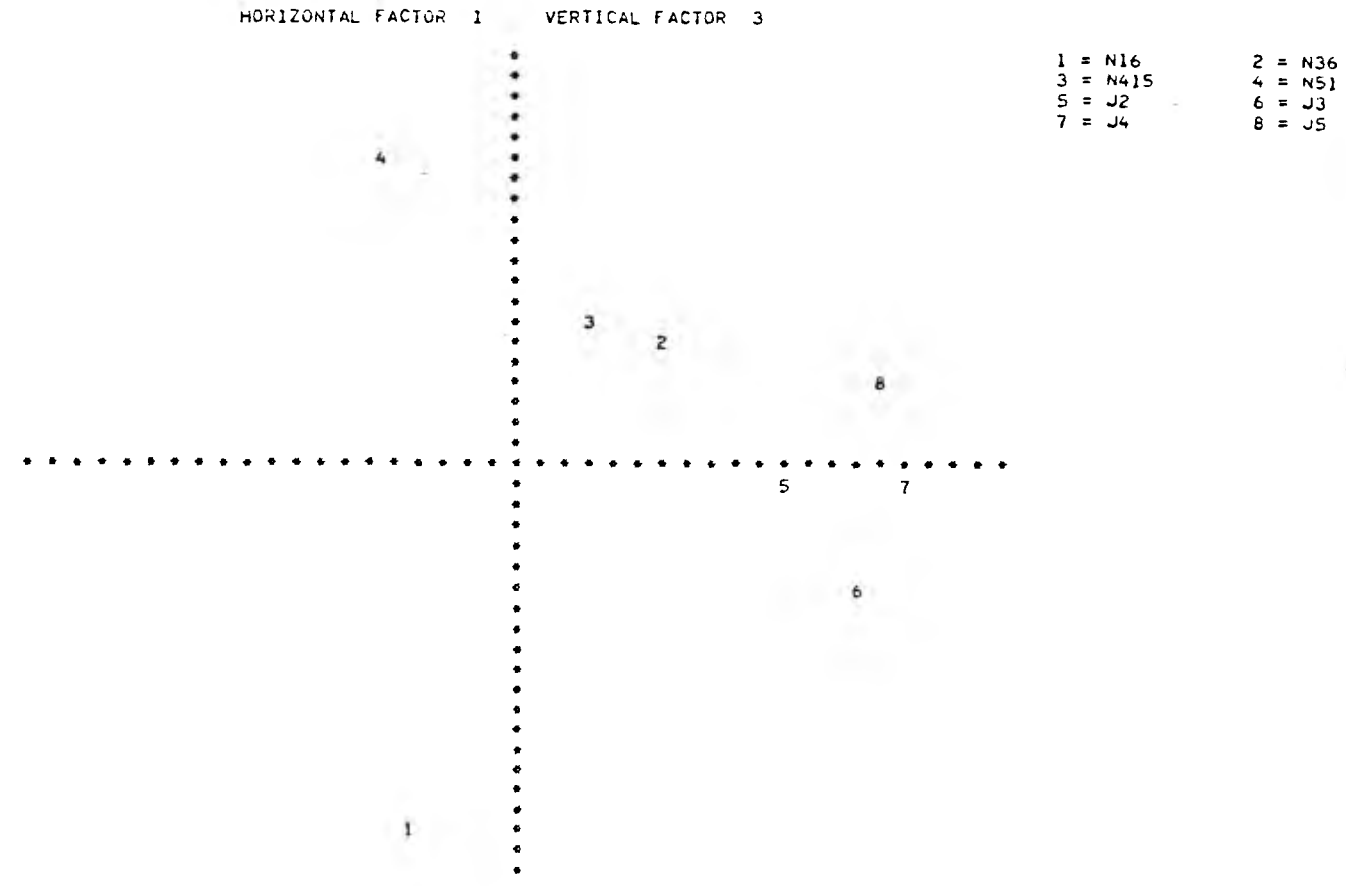
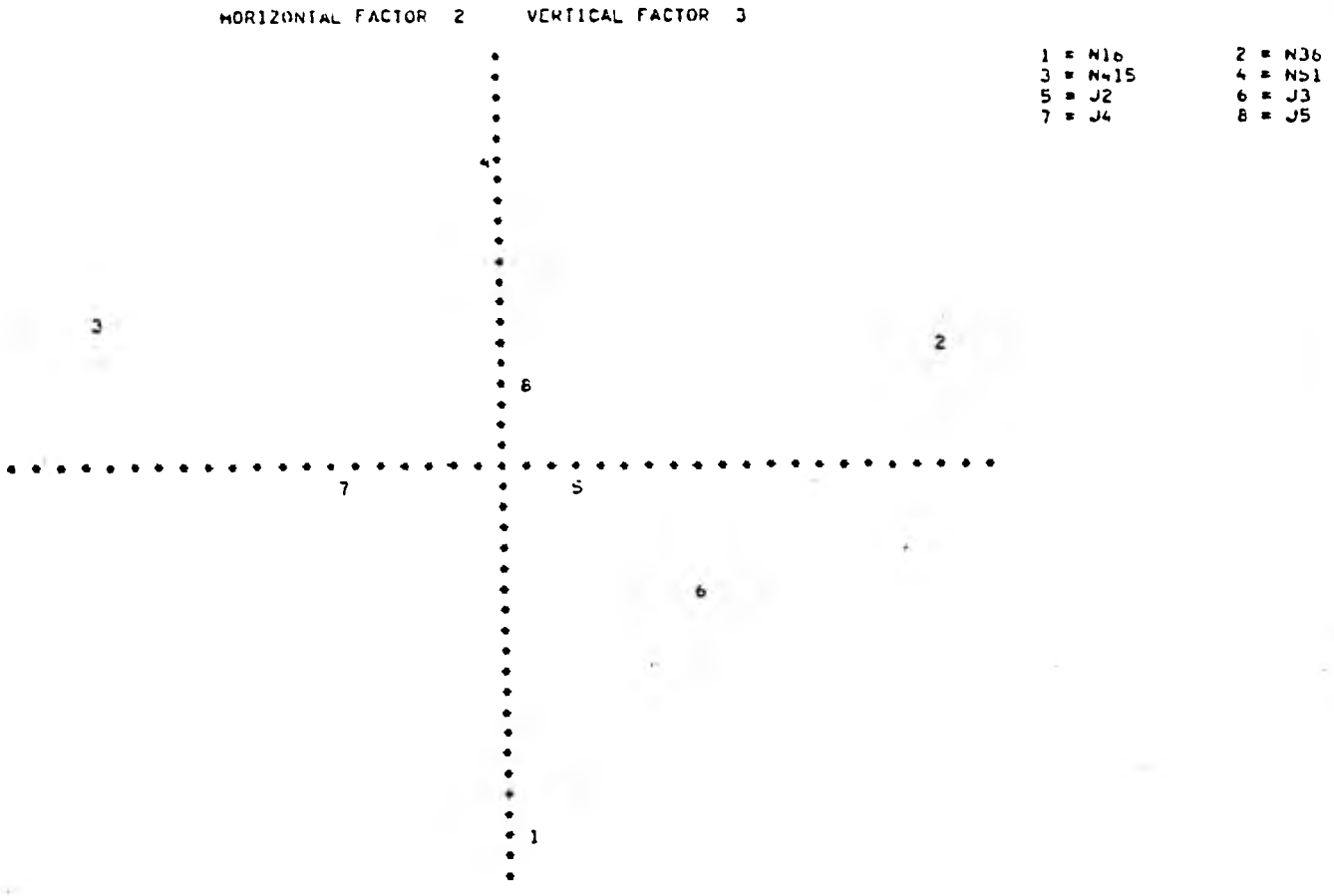


TABLE 6.8 (Continued)



Notes:

(1) The above plots are graphical presentation of the rotated orthogonal factors.

6.2.5 Age Effect on the MDT Indices and The Interaction Between N and J-indices.

Two methods of analysis were employed: (1) Pearson Correlation and (2) Oneway analysis of Variance (Trend analysis). Only some major results are presented here, more analyses are given in Appendix 6.2(G).

I. PEARSON CORRELATION

TABLE 6.9 Pearson Correlation: AGE with the major MDT indices

- - - - - - - - - - - - - P E A R S O N C O R R E L A T I O N C O E F F I C I E N T S - - - - - - - - - - - -

	AGE	CTA	CTB	CTC	CTD	CTE	N16	N36	N415	N51
AGE	1.0000	.2889	.0369	.2091	.2034	-.0602	-.0105	.2727	-.0870	-.2237
	(434)	(434)	(434)	(434)	(434)	(434)	(434)	(434)	(434)	(434)
	S= .001	S= .001	S= .221	S= .001	S= .001	S= .105	S= .414	S= .001	S= .035	S= .001
NR03	-.2739	-.5958	.4113	-.5433	-.0379	.6772	-.4699	-.5177	.7087	.6846
	(434)	(438)	(438)	(438)	(438)	(438)	(438)	(438)	(438)	(438)
	S= .001	S= .001	S= .001	S= .001	S= .214	S= .001	S= .001	S= .001	S= .001	S= .001

(COEFFICIENT / CASES / SIGNIFICANCE) (99.0000 MEANS UNCOMPUTABLE)

- - - - - - - - - - - - - P E A R S O N C O R R E L A T I O N C O E F F I C I E N T S - - - - - - - - - - - - - - - -

	AGE	CTA	CTB	CTC	CTD	CTE	N16	N36	N415	N51	NR03
AGE	1.0000	.2955	-.0411	.2344	.1322	-.0731	.0670	.1996	-.1097	-.2390	-.2752
	(280)	(280)	(280)	(280)	(280)	(280)	(280)	(280)	(280)	(280)	(280)
	S= .001	S= .001	S= .246	S= .001	S= .013	S= .111	S= .132	S= .001	S= .033	S= .001	S= .001
NR03	-.2752	-.6208	.4381	-.5613	-.0038	.6885	-.5074	-.5004	.7258	.7059	1.0000
	(280)	(283)	(283)	(283)	(283)	(283)	(283)	(283)	(283)	(283)	(283)
	S= .001	S= .001	S= .001	S= .001	S= .475	S= .001	S= .001	S= .001	S= .001	S= .001	S= .001
RJ03	-.1593	-.2611	.1905	-.1738	-.0838	.3089	-.2081	-.3022	.3112	.2026	.4113
	(280)	(283)	(283)	(283)	(283)	(283)	(283)	(283)	(283)	(283)	(283)
	S= .004	S= .001	S= .001	S= .002	S= .080	S= .001	S= .001	S= .001	S= .001	S= .001	S= .001
NRRJ03	-.2868	-.5928	.4286	-.5187	-.0310	.6550	-.4905	-.5011	.6875	.6436	.9495
	(280)	(283)	(283)	(283)	(283)	(283)	(283)	(283)	(283)	(283)	(283)
	S= .001	S= .001	S= .001	S= .001	S= .302	S= .001	S= .001	S= .001	S= .001	S= .001	S= .001
WNRRJ03	-.2849	-.5688	.4150	-.4914	-.0398	.6277	-.4730	-.4894	.6576	.6064	.9092
	(280)	(283)	(283)	(283)	(283)	(283)	(283)	(283)	(283)	(283)	(283)
	S= .001	S= .001	S= .001	S= .001	S= .252	S= .001	S= .001	S= .001	S= .001	S= .001	S= .001

TABLE 6.9 (Continued)

PEARSON CORRELATION COEFFICIENTS

	AGE	J1	J2	J3	J4	J5	RJ03
AGE	1.0000	.2451	.0994	.3670	.0901	.1679	-.1593
	(280)	(280)	(280)	(280)	(280)	(280)	(280)
	S= .001	S= .001	S= .048	S= .001	S= .066	S= .002	S= .004
VR03	-.2752	-.0534	-.1199	-.4789	.0669	-.0261	.4113
	(280)	(283)	(283)	(283)	(283)	(283)	(283)
	S= .001	S= .186	S= .022	S= .001	S= .131	S= .331	S= .001
RJ03	-.1593	.0686	-.4273	-.5203	.2060	.3698	1.0000
	(280)	(283)	(283)	(283)	(283)	(283)	(283)
	S= .004	S= .125	S= .001	S= .001	S= .001	S= .001	S= .001
VRRJ03	-.2868	-.0145	-.2491	-.5684	.1358	.1239	.6560
	(280)	(283)	(283)	(283)	(283)	(283)	(283)
	S= .001	S= .404	S= .001	S= .001	S= .011	S= .019	S= .001
VNRRJ03	-.2840	-.0005	-.2885	-.5862	.1568	.1736	.7263
	(280)	(283)	(283)	(283)	(283)	(283)	(283)
	S= .001	S= .497	S= .001	S= .001	S= .004	S= .002	S= .001

(COEFFICIENT / CASES / SIGNIFICANCE) (99.0000 MEANS UNCOMPUTABLE)

PEARSON CORRELATION COEFFICIENTS

	AGE	J1	J2	J3	J4	J5
AGE	1.0000	.2451	.0994	.3670	.0901	.1679
	(280)	(280)	(280)	(280)	(280)	(280)
	S= .001	S= .001	S= .048	S= .001	S= .066	S= .002
CTA	.2955	.0198	.1015	.3076	-.1000	.0648
	(280)	(283)	(283)	(283)	(283)	(283)
	S= .001	S= .370	S= .044	S= .001	S= .047	S= .139
CTB	-.0411	.2228	.0160	-.0381	.1644	.2235
	(280)	(283)	(283)	(283)	(283)	(283)
	S= .246	S= .001	S= .394	S= .262	S= .003	S= .001
CTC	.2344	.2197	.0258	.3863	.1847	.0676
	(280)	(283)	(283)	(283)	(283)	(283)
	S= .001	S= .001	S= .333	S= .001	S= .001	S= .129
CTD	.1322	.2900	.2164	.2543	.2063	.2290
	(280)	(283)	(283)	(283)	(283)	(283)
	S= .013	S= .001	S= .001	S= .001	S= .001	S= .001
CTE	-.0731	.1119	-.0582	-.2321	.2161	.0308
	(280)	(283)	(283)	(283)	(283)	(283)
	S= .111	S= .030	S= .165	S= .001	S= .001	S= .303
V16	.0670	-.1981	.0130	.0820	-.1556	-.1851
	(280)	(283)	(283)	(283)	(283)	(283)
	S= .132	S= .001	S= .414	S= .084	S= .004	S= .001
V36	.1996	.1642	.1806	.4177	-.0357	.2016
	(280)	(283)	(283)	(283)	(283)	(283)
	S= .001	S= .003	S= .001	S= .001	S= .275	S= .001
V415	-.1097	.1345	-.0418	-.2230	.2494	.0479
	(280)	(283)	(283)	(283)	(283)	(283)
	S= .033	S= .012	S= .242	S= .001	S= .001	S= .211
V51	-.2390	-.1645	-.0392	-.3619	-.1440	-.0268
	(280)	(283)	(283)	(283)	(283)	(283)
	S= .001	S= .003	S= .256	S= .001	S= .008	S= .327

(COEFFICIENT / CASES / SIGNIFICANCE) (99.0000 MEANS UNCOMPUTABLE)

Notes:

(1) For the details of the sample used, see Note(4) in Table 6.10.

II. Trend Analysis

Oneway analysis of variance of the CT, major N and J, and NRRJO3, WNRRJO3 indices was performed on

(1) 5 sample groups i.e. EDUC (1,5)

(2) 5 categorical divisions of NRO3 using the following operation:

```
*RECODE        NRO3(LOWEST THRU -0.5=1) (-0.49999 THRU 2=2)
               (2.00001 THRU 4=3) (4.00001 THRU 6=4)
               (6.00001 THRU HIGHEST=5)
```

(3) 5 categorical divisions of RJO3 using the following operations:

```
*RECODE        RJO3(LOWEST THRU -1=1) (-0.99999 THRU 0=2)
               (0.00001 THRU 1=3) (1.00001 THRU 2=4)
               (2.00001 THRU HIGHEST=5)
```

As usual, a sample of N=438 was used for studying CT, N and NR indices and a sample of N=283 was used for studying J, RJ, NRRJ and WNRRJ indices.

In the following table, only the significance and the linear term of the analysis are shown.

TABLE 6.10

ONEWAY Analysis of Variance of the Major MDT Indices.

	EDUC				NRO3				RJO3			
	O.M.	B.G.	Lin-ear	DEV.	O.M.	B.G.	Lin-ear	Dev.	O.M.	B.G.	Lin-ear	Dev.
CTA	(+)	***	***	***	-	***	***	***	-	***	***	
CTB	(+)	***	**	***	+	***	***		(+)	*	**	
CTC	+	**	***		-	***	***		-		**	
CTD	+	***	***			*						
CTE				*	+	***	***		+	***	***	
N16	-	***	**	***	-	***	***		(-)	**	***	
N36	+	***	***		-	***	***	**	-	***	***	
N415		**		**	+	***	***	*	+	***	***	
N51	(-)	***	***		+	***	***	*	+	*	***	

TABLE 6.10. Continued.

	EDUC				NRO3				RJO3			
	O.M.	B.G.	Lin-ear	Dev.	O.M.	B.G.	Lin-ear	Dev.	O.M.	B.G.	Lin-ear	Dev.
J1	+	***	***									
J2					((-))				(-)	***	***	*
J3	+	***	***	*	-	***	***		-	***	***	
J4		***	(1)	***	(+)				(+)	**	***	
J5	+		*						+	***	***	
NRO3	((-))	***	***	***	na	na	na	na	+	***	***	
NRO3	((-))	***	***		+	***	***		na	na	na	na
NRRJO3	((-))	***	*	***	+	***	***	***	+	***	***	
WNRRJO3	((-))	***	*	***	+	***	***	***	+	***	***	

NOTES:

(1) P=0.0584

(2) Significance: * $p \leqslant 0.05$ ** $p \leqslant 0.01$ *** $p \leqslant 0.001$
na = not applicable

(3) Abbreviations used:
O.M.: Order of the Means
"+" means values increase from EDUC=1 to EDUC=5
"-" decrease. Similarly defined for NRO3 and RJO3
( ) less clear order of the means (( )) least clear.
B.G.: Between Groups.
Linear: Linear term (i.e. linear trend analysis)
Dev.: Deviation from the Linear term.

(4) The details of the number of subjects (N) in each of the five groups classified by the variables EDUC, NRO3 and RJO3 are as follows:

TABLE 6.11: Classification of Subjects by EDUC,NRO3 & RJO3.

EDUC			NRO3			RJO3		
Group	N(I)	N(II)	Group	N(I)	N(II)	Group	N(I)	N(II)
1	132	0	1	28	21	1	37	37
2	62	60	2	76	50	2	62	62
3	126	112	3	112	77	3	82	82
4	66	63	4	115	66	4	55	55
5	52	48	5	107	69	5	47	47
Total	438	283	Total	438	283	Total	283	283

N(I) refers to the N used in the computation of CT, N and NR indices. Similarly N(II) refers to the N used in the computation of J, RJ, NRRJ and WNRRJ indices.

6.2.6 Analysis of the MDT Rankings.

I. MDT Part I.

The analysis proposed in Section 4.4.1 was performed.

In the following tables, TRC01 TO TRC05 refer to the average Ranking Consistency Score of the item 1 to 5 in MDT(A). TRC1234 is the average of TRC01 TO TRC04 and TRCALL is the average of TRC01 TO TRC05. That is, full consistency will lead to a TRC Score of 1 and full inconsistency is zero.

TABLE 6.12 TRC - Analysis: MDT Part II Rankings

VARIABLE	CASES	MEAN	STD DEV
AGE	345	16.0233	4.4769
NR03	347	3.9731	3.0754
TRC01	347	.6852	.1923
TRC02	347	.6840	.1889
TRC03	347	.6073	.2408
TRC04	347	.7257	.1925
TRC05	347	.5437	.4121
TRC1234	347	.6756	.1169
TRCALL	347	.6492	.1330

PEARSON CORRELATION COEFFICIENTS

	TRC01	TRC02	TRC03	TRC04	TRC05	TRC1234	TRCALL
AGE	.0069	.0009	.0452	.1292	.0630	.0795	.0948
	(345)	(345)	(345)	(345)	(345)	(345)	(345)
	S= .449	S= .494	S= .201	S= .008	S= .122	S= .070	S= .039
NR03	.0422	.0222	-.0289	.0776	.2052	.0434	.1577
	(347)	(347)	(347)	(347)	(347)	(347)	(347)
	S= .216	S= .340	S= .296	S= .074	S= .001	S= .210	S= .002

(COEFFICIENT / CASES / SIGNIFICANCE) (99.0000 MEANS UNCOMPUTABLE)

TABLE 6.13. Oneway Analysis of Variance of the TRC Scores.

	EDUC				NRO3				RJO3			
	O.M.	B.G.	Lin-ear	Dev.	O.M.	B.G.	Lin-ear	Dev.	O.M.	B.G.	Lin-ear	Dev.
TRC01												
TRC02												
TRC03												
TRC04	((+))	**	**									
TRC05					+	***	***		+	***	***	
TRC1234		**		*			*	*				
TRCALL	((+))	**	**		+	***	***	**	+	*	***	

NOTES.

(1) See Notes (1) and (2) of TABLE 6.10.
(2) The sample consists of N=347 for the analysis of TRC scores by EDUC and NRO3, and N=235 by RJO3.

II. MDT Part II.

The analysis proposed in Section 4.4.2 was carried out. The Computer Codes for S_1 to S_5 are RANKJ1 TO RANKJ5 and for S is RANKR (or RANKR1; percentage score of S is RANKR2).

TABLE 6.14

Oneway Analysis of Variance of the RANKJ Scores.

	EDUC				WRO3				RJO3			
	O.M.	B.G.	Lin-ear	Dev.	O.M.	B.G.	Lin-ear	Dev.	O.M.	B.G.	Lin-ear	Dev.
RANKJ1	((-))	*	*									
RANKJ2	(+)	*	**						+	***	***	
RANKJ3	(-)	***	***		+	***	***		+	***	***	
RANKJ4					-	***	***	***	-	***	***	
RANKJ5	((+))	*	*			*			-	***	***	
RANKJ6					-	*	**		-	*	**	
RANKP	((+))	**	*	*	(-)	**	*		-	***	***	
RANKR	((+))	**	*	**	-	**	***		-	***	***	

NOTES

(1) See Notes (2) and (3) in TABLE 6.10.

(2) The sample consists of N=206 (39 F.3, 91 F.4, 35 F.6 and 41 adult subjects).

More results of the analysis of the MDT ranking data are given in Appendix 6.2(H).

6.2.7 Sex-Age Effect on the MDT indices.

I. T-Test

A t-test of the means of the major MDT indices between the male and female groups was performed.

TABLE 6.15

Sex Differences in the Means of the Major MDT Indices.

	T-TEST				T-TEST		
	t	p			t	p	
CTA	-2.96	0.003	**	J1	2.41	0.016	*
CTB	2.71	0.007	**	J2	0.11	0.912	
CTC	-1.78	0.076		J3	0.99	0.321	
CTD	1.89	0.059		J4	-0.94	0.349	
CTE	-0.43	0.664		J5	-0.19	0.850	
N16	-3.17	0.002	**	RJO3	-1.30	0.194	
N36	2.84	0.005	**				
N415	0.38	0.705		NRRJO3	0.53	0.596	
N51	2.36	0.019	*	WNRRJO3	0.27	0.788	
NRO3	1.23	0.219					

NOTES

(1) The sex of two cases is unknown. The sample for computing the t-values is N=436(232 male and 204 female subjects) for CT, N and NRO3 indices, and N=281 (139 male and 142 female subjects) for J, RJO3, NRRJO3 and WNRRJO3 indices.

(2) A positive t implies that the mean of the male group is greater than that of the female group. A negative t means the reverse.

(3) *$p \leq 0.05$ ** $p \leq 0.01$ *** $p \leq 0.001$

II. Analysis of Variance.

The SPSS ANOVA was carried out for the major MDT indices BY AGE(1,5), SEX(1,2).

The classification of AGE is as follows:

(1) 12+ to 14 Years (2) 14+ to 16 Years

(3) 16+ to 18 Years (4) 18+ to 22 Years

(5) 22+ Years.

For the SEX variable, 1=male and 2=female.

TABLE 6.16 ANOVA of the Major MDT Indices By Age (1, 5), SEX (1, 2)

(A) MDT Part 1

MDT Indices / Variance	CTA	CTB	CTC	CTD	CTE	N16	N36	N415	N51	NRO3
Main Effect										
F	10.23	9.93	4.83	7.07	1.69	10.83	10.05	2.74	6.39	8.27
P	0.001 ***	0.001 ***	0.001 ***	0.001 ***	0.136	0.001 ***	0.001 ***	0.019 *	0.001 ***	0.001 ***
AGE										
F	10.43	10.49	5.22	7.88	2.03	10.89	10.13	3.41	6.56	10.02
P	0.001 ***	0.001 ***	0.001 ***	0.001 ***	0.090	0.001 ***	0.001 ***	0.009 **	0.001 ***	0.001 ***
SEX										
F	3.78	7.77	1.03	6.91	0.57	10.14	16.30	0.001	2.18	0.007
P	0.053	0.006 **	0.310	0.009 **	0.453	0.002 **	0.001 ***	0.980	0.141	0.935
AGE x SEX										
F	2.38	1.23	1.58	0.60	1.22	1.82	0.91	1.33	1.27	1.85
P	0.051	0.297	0.178	0.665	0.301	0.124	0.456	0.258	0.281	0.118
Explained										
F	6.78	6.06	3.38	4.20	1.48	6.82	5.99	2.11	4.11	5.42
P	0.001 ***	0.001 ***	0.001 ***	0.001 ***	0.152	0.001 ***	0.001 ***	0.027 *	0.001 ***	0.001 ***

Notes:
(1) *$p \leq 0.05$ **$p \leq 0.01$ ***$p \leq 0.001$
(2) The sex or age or both of 5 cases are unknown. Total N = 433 (230 male and 203 female subjects)
(3) N for each AGE group are: (1) 157 (2) 160 (3) 54 (4) 27 (5) 35.

(B) MDT Part II.

MDT Indices / Variance	J1	J2'	J3	J4	J5	RJO3	WRRJO3	WNRRJO3
Main Effect								
F	8.21	1.46	10.21	1.43	3.51	4.20	5.85	5.91
P	0.001 ***	0.202	0.001 ***	0.213	0.004 **	0.001 ***	0.001 ***	0.001 ***
AGE	8.65							
F	8.65	1.82	12.44	1.62	4.37	4.73	7.26	7.38
P	0.001 ***	0.126	0.001 ***	0.170	0.002 **	0.001 ***	0.001 ***	0.001 ***
SEX								
F	9.92	0.22	5.17	0.28	0.003	4.39	0.16	0.463
P	0.002 **	0.641	0.024 *	0.599	0.958	0.037 *	0.692	0.497
AGE x SEX								
F	2.26	2.79	1.51	0.40	1.64	0.29	1.43	1.29
P	0.063	0.027 *	0.200	0.809	0.164	0.886	0.224	0.273
Explained								
F	5.56	2.05	6.34	0.97	2.68	2.46	3.89	3.86
P	0.001 ***	0.034 *	0.001 ***	0.463	0.005 **	0.010 **	0.001 ***	0.001 ***

Notes:

(1) * $p \leq 0.05$ ** $p \leq 0.01$ *** $p \leq 0.001$

(2) The sex or age or both of 4 cases are unknown. Total N=279 (138 male and 141 female subjects)

(3) N in each AGE group are: (1) 26 (2) 145 (3) 51 (4) 26 (5) 31.

6.2.8 Validity Study.

I. General Study

Since most of the validity data, except DIT scores, were provided by school-children, the correlations between the major MDT indices and validating test scores were performed for the following samples.

(1) F2, F.3 and F.4 groups.

(2) F.2 group only

(3) F.3 and F.4 groups.

The results of (1) are presented here while the results of (2) and (3) are given in Appendix 6.2(I).

TABLE 6.17 Validity Study (F.2, F.3 and F.4 groups)

PEARSON CORRELATION COEFFICIENTS

	AGE	MMS	JEPIE	JEPIN	JEPIL	RPM	SRT	TT
AGE	1.0000	.3988	-.0206	-.1030	.0116	-.2695	.0818	.4096
	(434)	(43)	(143)	(143)	(143)	(55)	(60)	(26)
	S= .001	S= .004	S= .404	S= .110	S= .445	S= .023	S= .267	S= .019
CTA	.2889	-.1507	.0376	-.2189	.1899	.0400	.1448	.0675
	(434)	(43)	(143)	(143)	(143)	(56)	(60)	(26)
	S= .001	S= .167	S= .464	S= .004	S= .012	S= .385	S= .135	S= .372
CTB	.0369	.1696	.0458	-.1783	-.2050	.0994	.4903	.0145
	(434)	(43)	(143)	(143)	(143)	(56)	(60)	(26)
	S= .221	S= .242	S= .293	S= .017	S= .007	S= .233	S= .001	S= .472
CTC	.2091	.1556	-.0750	-.1255	.1221	.2651	.0685	.1235
	(434)	(43)	(143)	(143)	(143)	(56)	(60)	(26)
	S= .001	S= .160	S= .187	S= .068	S= .073	S= .024	S= .302	S= .274
CTD	.2034	.3809	-.0623	-.1744	-.0380	.2047	.2205	.1297
	(434)	(43)	(143)	(143)	(143)	(56)	(60)	(26)
	S= .001	S= .006	S= .230	S= .019	S= .326	S= .065	S= .045	S= .264
CTE	-.0602	-.1613	.0861	.0552	-.1058	-.0064	.0623	-.0490
	(434)	(43)	(143)	(143)	(143)	(56)	(60)	(26)
	S= .105	S= .259	S= .153	S= .256	S= .104	S= .481	S= .318	S= .406
N1S	-.0105	-.1479	-.0434	.1580	.2346	-.1136	-.4812	.0675
	(434)	(43)	(143)	(143)	(143)	(56)	(60)	(26)
	S= .414	S= .172	S= .303	S= .030	S= .002	S= .202	S= .001	S= .372
N3S	.2727	.4255	-.0932	-.1689	.0052	.0923	.1319	.2188
	(434)	(43)	(143)	(143)	(143)	(56)	(60)	(26)
	S= .001	S= .002	S= .134	S= .022	S= .476	S= .249	S= .158	S= .141
N4S	-.0870	-.0431	.0748	.0509	-.1445	.0232	.0659	-.0345
	(434)	(43)	(143)	(143)	(143)	(56)	(60)	(26)
	S= .035	S= .392	S= .187	S= .273	S= .043	S= .433	S= .309	S= .434
NS1	-.2237	-.2817	.0952	.0626	-.1347	-.3012	.0908	.0271
	(434)	(43)	(143)	(143)	(143)	(56)	(60)	(26)
	S= .001	S= .097	S= .129	S= .229	S= .054	S= .012	S= .245	S= .448
NR03	-.2739	-.2585	.1314	.0679	-.2023	-.1578	.2063	-.1169
	(434)	(43)	(143)	(143)	(143)	(56)	(60)	(26)
	S= .001	S= .047	S= .059	S= .210	S= .008	S= .123	S= .057	S= .285

(COEFFICIENT / CASES / SIGNIFICANCE) (99.0000 MEANS UNCOMPUTABLE)

II. Relationships Between MDT and DIT.

Two major analyses were carried out:

(1) The Pearson correlations between the major MDT indices and the DIT scores, and the corresponding partial correlations by age were computed.

(2) Factor analysis of the major N and J indices of the MDT, and the DJ indices of the DIT was performed.

The results of (1) and (2) are given in Tables 6.18 and 6.19 correspondingly. The results of some refined analyses between other MDT indices (CT, N and J indices) and DIT indices/scores (DJ1 TO DJ5 and DRJ03) are given in Appendix 6.2(J). Some of the details of the above factor analysis are also given in Appendix 6.2(J).

TABLE 6.18 (A) Pearson Correlation: MDT with DIT (N = 117)

PEARSON CORRELATION

	AGE	NR03	RJ03	NRRJ03	WNRRJ03
AGE	1.0000 (117) S= .001	-.4502 (117) S= .001	-.3482 (117) S= .001	-.4667 (117) S= .001	-.4624 (117) S= .001
DRJ03	-.3458 (117) S= .001	.3206 (117) S= .001	.3165 (117) S= .001	.3572 (117) S= .001	.3618 (117) S= .001

(COEFFICIENT / CASES / SIGNIFICANCE) (99.0000 MEANS UNCOMPUTABLE)

PARTIAL CORRELATION

CONTROLLING FOR.. AGE

	NR03	RJ03	NRRJ03	WNRRJ03
DRJ03	.1969 (114) S= .017	.2229 (114) S= .008	.2360 (114) S= .005	.2427 (114) S= .004

(COEFFICIENT / (D.F.) / SIGNIFICANCE)

Notes:

(1) Rejecting Criterion RC - II - 2 is applied in the above analysis.

TABLE 6.18 (B) Pearson Correlation: MDT with DIT (N = 86)

PEARSON CORRELATION COEFFICIENTS

	AGE	NR03	RJ03	NRRJ03	WNRRJ03	TRC1234	TRCALL	SNALL	RANKP	RANKR
AGE	1.0000	-.4372	-.2931	-.4416	-.4327	-.0369	.0197	-.2459	.3265	.3284
	(86)	(86)	(86)	(86)	(86)	(86)	(86)	(86)	(86)	(86)
	S= .001	S= .001	S= .003	S= .001	S= .001	S= .368	S= .429	S= .011	S= .001	S= .001
DRJ03	-.3627	.3323	.3184	.3715	.3757	-.1119	-.0267	.3268	-.2129	-.3653
	(86)	(86)	(86)	(86)	(86)	(86)	(86)	(86)	(86)	(86)
	S= .001	S= .001	S= .001	S= .001	S= .001	S= .153	S= .404	S= .001	S= .025	S= .001
DITP	.6100	-.3032	-.3103	-.3463	-.3524	.1610	.1620	-.2048	.4751	.4471
	(86)	(86)	(86)	(86)	(86)	(86)	(86)	(86)	(86)	(86)
	S= .001	S= .002	S= .002	S= .001	S= .001	S= .069	S= .068	S= .029	S= .001	S= .001
DITD	.7106	-.4376	-.4694	-.5079	-.5191	.0771	.0786	-.2435	.4401	.5126
	(86)	(86)	(86)	(86)	(86)	(86)	(86)	(86)	(86)	(86)
	S= .001	S= .001	S= .001	S= .001	S= .001	S= .240	S= .236	S= .012	S= .001	S= .001

(COEFFICIENT / CASES / SIGNIFICANCE) (99.0000 MEANS UNCOMPUTABLE)

PARTIAL CORRELATION COEFFICIENTS

CONTROLLING FOR..	AGE								
	NR03	RJ03	NRRJ03	WNRRJ03	TRC1234	TRCALL	SNALL	RANKP	RANKR
DITP	-.0512	-.1736	-.1082	-.1238	.2317	.1893	-.0713	.3684	.3298
	(83)	(83)	(83)	(83)	(83)	(83)	(83)	(83)	(83)
	S= .321	S= .056	S= .162	S= .129	S= .016	S= .041	S= .258	S= .001	S= .001
DITD	-.2006	-.3882	-.3074	-.3337	.1470	.0919	-.1007	.3129	.4202
	(83)	(83)	(83)	(83)	(83)	(83)	(83)	(83)	(83)
	S= .033	S= .001	S= .002	S= .001	S= .090	S= .201	S= .179	S= .002	S= .001
DRJ03	.2073	.2381	.2527	.2603	-.1345	-.0210	.2630	-.1072	-.2797
	(83)	(83)	(83)	(83)	(83)	(83)	(83)	(83)	(83)
	S= .028	S= .014	S= .010	S= .008	S= .110	S= .425	S= .008	S= .164	S= .005

(COEFFICIENT / (D.F.) / SIGNIFICANCE) (A VALUE OF 99.0000 IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED)

Notes:

(1) Rejecting Criterion RC - II - 3 is applied in the above analysis.

TABLE 6.19 Principal Component Analysis: J2, J3, J4, J5, DJ2, DJ3, DJ4 and DJ5 Indices

VARIABLE	MEAN	STANDARD DEV	CASES
J2	3.0188	.7395	117
J3	2.8381	.6205	117
J4	3.3815	.5553	117
J5	2.9543	.4961	117
DJ2	3.0342	.6560	117
DJ3	2.5430	.5446	117
DJ4	3.0919	.5452	117
DJ5	3.0254	.4931	117

FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
1	2.70652	33.8	33.8
2	1.26821	15.9	49.7
3	1.08958	13.6	63.3
4	.85936	10.7	74.0
5	.69169	8.6	82.7
6	.55143	6.9	89.6
7	.46631	5.8	95.4
8	.36670	4.6	100.0

CORRELATION COEFFICIENTS..

	J2	J3	J4	J5	DJ2	DJ3	DJ4	DJ5
J2	1.00000	.23024	.15537	.05571	.15711	.24113	.17328	.10116
J3	.23024	1.00000	.32677	.34396	.26301	.38096	.30599	.08554
J4	.15537	.32677	1.00000	.39570	.05736	.13026	.56875	.02878
J5	.05571	.34396	.39570	1.00000	.18562	.23141	.35392	.39994
DJ2	.15711	.26301	.05736	.18562	1.00000	.43483	.17545	.16337
DJ3	.24113	.38096	.13026	.23141	.43483	1.00000	.24562	.21014
DJ4	.17328	.30599	.56875	.35392	.17545	.24562	1.00000	.16708
DJ5	.10116	.08554	.02878	.39994	.16337	.21014	.16708	1.00000

FACTOR MATRIX USING PRINCIPAL FACTOR, NO ITERATIONS

	FACTOR 1	FACTOR 2	FACTOR 3
J2	.39585	.23475	-.43769
J3	.66581	.04652	-.25854
J4	.81819	-.61263	-.18493
J5	.66851	-.21202	.46727
DJ2	.56073	.57073	-.05545
DJ3	.61982	.50138	-.11454
DJ4	.68561	-.41493	-.09198
DJ5	.41532	.20345	.74435

VARIABLE	COMMUNALITY
J2	.40330
J3	.51232
J4	.79168
J5	.71019
DJ2	.57953
DJ3	.64867
DJ4	.65069
DJ5	.76794

VARIMAX ROTATED FACTOR MATRIX
AFTER ROTATION WITH KAISER NORMALIZATION

	FACTOR 1	FACTOR 2	FACTOR 3
J2	.18902	.57105	-.20364
J3	.40849	.53936	.04387
J4	.88937	.02598	.00550
J5	.50685	.08843	.66744
DJ2	-.05612	.72413	.22809
DJ3	.08541	.77167	.21426
DJ4	.77568	.16929	.14265
DJ5	-.01499	.11582	.86850

TRANSFORMATION MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
FACTOR 1	.67460	.61532	.40780
FACTOR 2	-.70986	.69230	.12968
FACTOR 3	-.20252	-.37697	.90382

FACTOR SCORE COEFFICIENTS

	FACTOR 1	FACTOR 2	FACTOR 3
J2	.04860	.36954	-.27934
J3	.18797	.26621	-.10939
J4	.53137	-.12990	-.12291
J5	.19845	-.12541	.46665
DJ2	-.18434	.44458	.08781
DJ3	-.10486	.45424	.04965
DJ4	.42024	-.03881	-.01542
DJ5	-.14871	-.05264	.70082

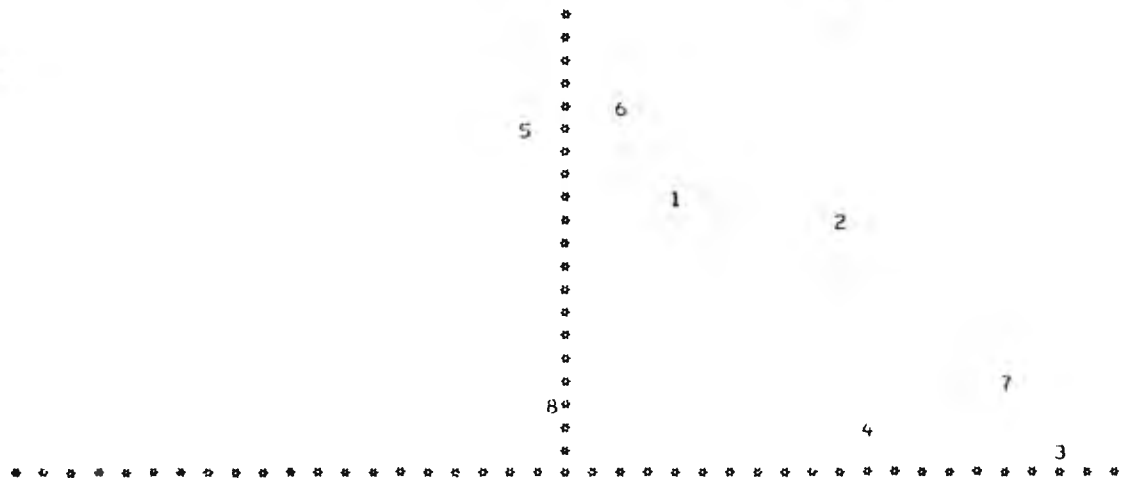
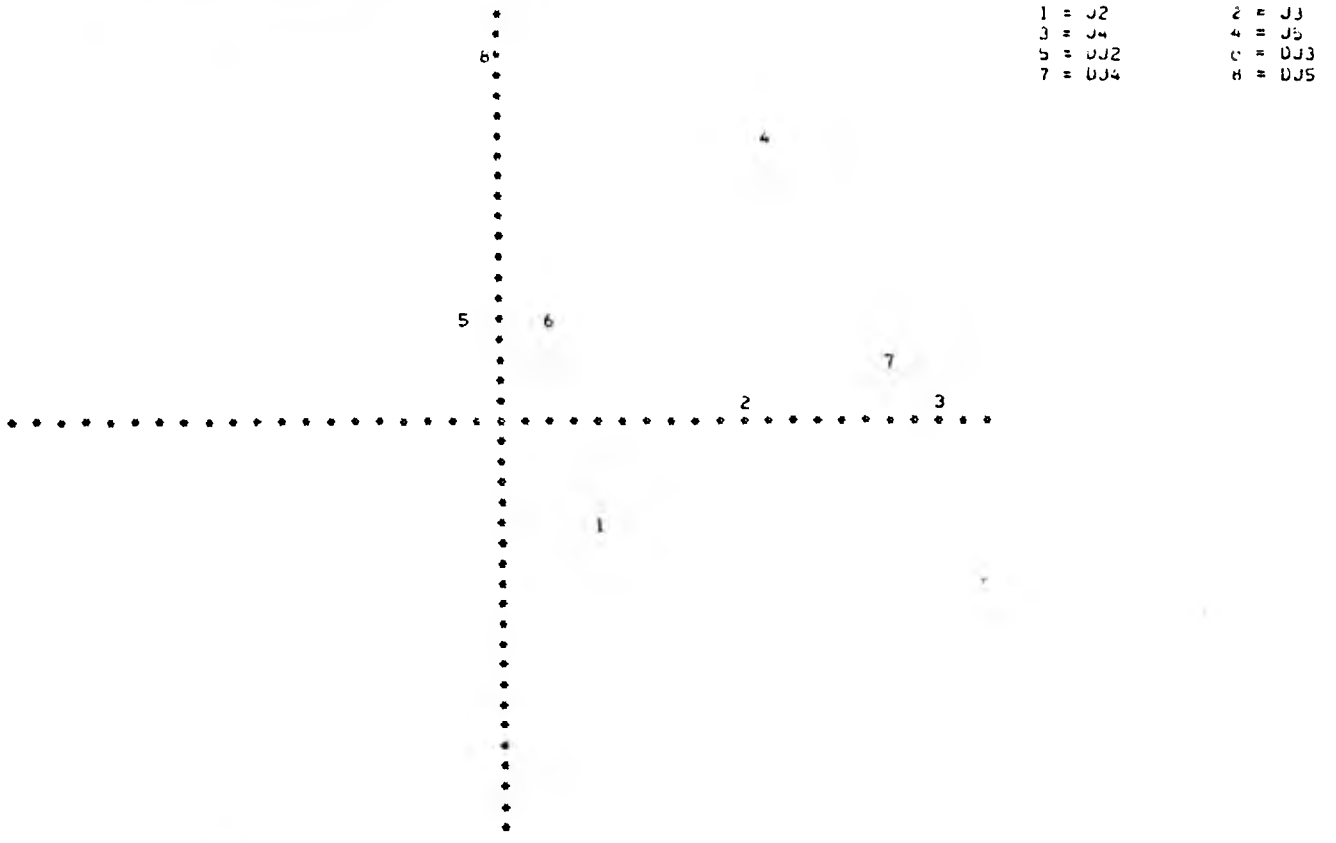
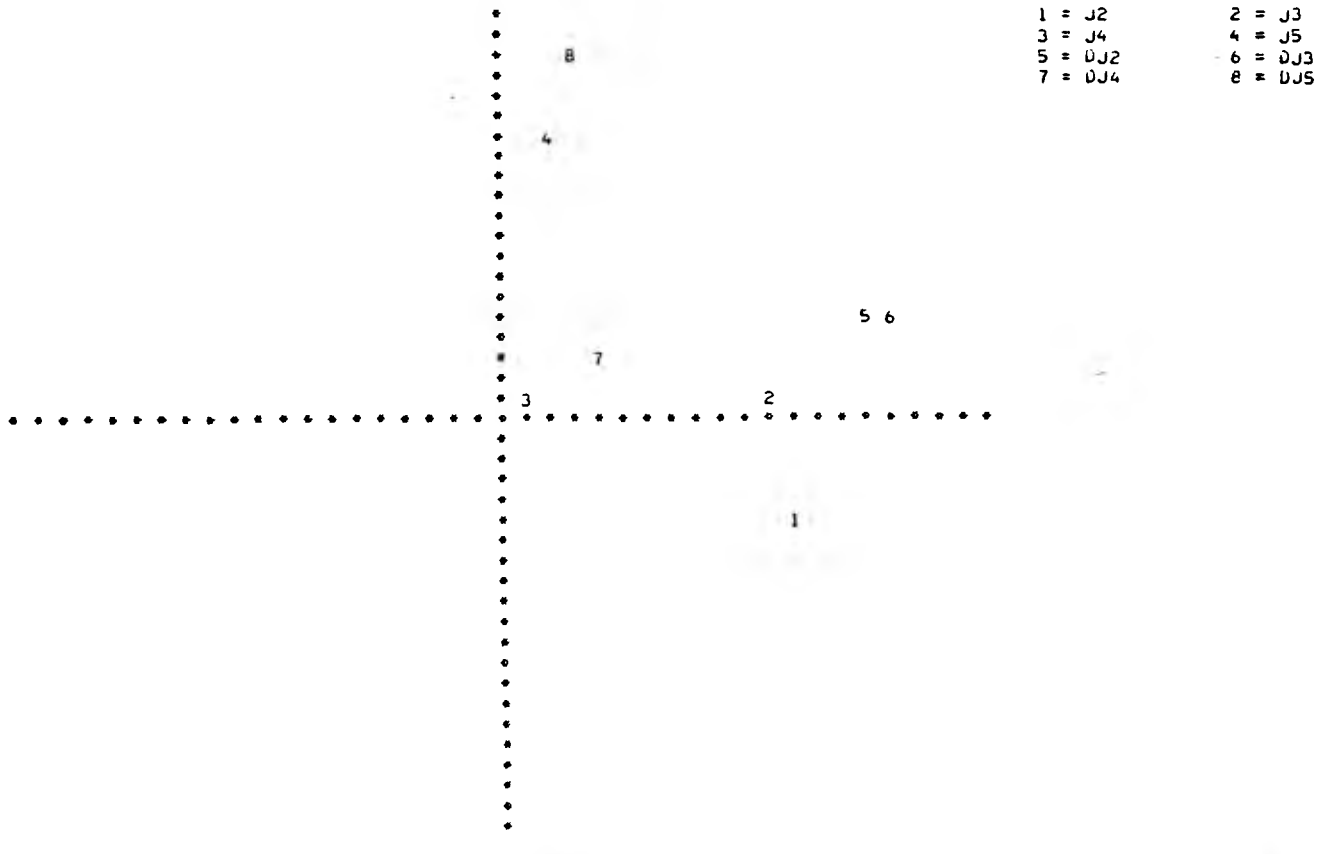


TABLE 6.19 (Continued)

HORIZONTAL FACTOR 1 VERTICAL FACTOR 3



HORIZONTAL FACTOR 2 VERTICAL FACTOR 3



6.3 London Study: MDT Form B

As shown in Table 5.4.1, only a small amount of data was collected using the MDT Form B. All the subjects used were either F.2 or F.4 students. It would be misleading to carry out refined analyses using a small sample of homogeneous background, therefore only the following analyses were performed:

(1) Internal Consistency Reliability of the MDT Part I indices.
(2) The Hierarchical order of the N-indices.
(3) Qualitative analysis of the item responses.
(4) Pearson Correlation between the MDT indices.
(5) Sex differences in the N indices.

For a similar detailed description of the above analyses, see Sections 6.2.1, 6.2.2, 6.2.3 and 6.2.5. It should be noted that most of the analyses were concerned with the MDT Part I only because the F.2 subjects were usually asked to respond to Part I questions only.

The results of (1) and (2) are presented here while those of (3) to (5) are put in Appendix 6.3.

TABLE 6.20

Internal Consistency Reliability of MDT Form B (Part I only)

	r	σ_i	σ_{meas}
CTD	0.820	0.951	0.404
CTF	0.805	1.147	0.507
CTG	0.766	1.319	0.638
CTH	0.848	1.448	0.565
CTK(4)	0.182	0.773	0.699
BN15	0.619	0.935	0.577
BN29	0.709	0.962	0.519
BN38	0.533	0.630	0.431
BN47	0.774	0.860	0.409
BN51	0.642	1.042	0.624
BNRO1	0.827	2.276	0.947
BNRO2	0.802	3.850	1.268
BNRO3	0.781	3.459	1.619
Average BNR	0.803	na	na

Notes:

(1) The sample used consists of 23F.2, 1 F.3 and 21 F.4 subjects. The total N = 45.

(2) Rejecting Criteria Used:

REJECT IF (MBCTALL LT 35)

This means that only subject who have answered all the item responses in Part I will be analysed.

(3) See also notes in Table 6.5.

(4) It is found that the low reliability of CTK is mainly due to KA04 (i.e. X_4). Deleting this item makes CTK become identical to BN15, which has a reliability of 0.619.

TABLE 6.21

The Means and Standard Deviations of Some Important BN-indices.

	F.2		F.4	
	Mean	S.D.	Mean	S.D.
BN15	4.82	1.22	5.11	0.97
BN29	5.20	0.95	4.58	1.00
BN38	2.55	0.51	2.83	0.75
BN47	3.68	0.95	3.73	0.92
BN51	4.11	1.09	4.17	1.06
BN31	2.87	0.58	2.57	0.57
BN301	1.21	0.59	1.23	0.67
BN32	1.45	0.52	2.09	1.41
BN33	2.26	0.87	3.36	1.42
BN42	5.69	1.66	4.96	1.99
BN43	5.19	1.40	4.30	2.08
BN44	4.28	1.36	3.93	1.70

Notes:

(1) The sample used consists of 29 F.2 and 22 F.4 subjects. The total N = 51.

(2) See also Section 6.2.3.

(3) BN301 = (DA01 + FA03)/2.

(4) Both BN31 and BN301 are indices expressing the coefficient $\alpha_3(\beta_1)$. They differ in one major aspect: BN31 consists of 4 item responses while BN301 consists of two only. BN301, instead of BN31 will be used here.

The order of the BN-indices is studied by a method similar to that described in Section 6.2.3(II). The orders of the ratings of the relevant BN-indices are expressed by the scores BSNO1 to BSNO3.

(1) The order of BN38, BN47, BN51 (i.e. α_3, α_4, α_5)

```
COMPUTE     BSNO1=0
IF          (BN38 LE BN47) BSNO1+BSNO1+1
IF          (BN38 LE BN47 AND BN47 LE.
            BN51)     BSNO1=BSNO1+1
```

(2) The order of BN31 (or BN3O1), BN32, BN33 (i.e. $\alpha_{31}(\beta_1)$, $\alpha_{31}(\beta_2)$, $\alpha_{31}(\beta_{41})$)

```
COMPUTE     BSNO2=0
IF          (BN31 LE BN32)   BSNO2=BSNO2+1
IF          (BN31 LE BN32 AND BN32  LE  BN33)
            BSNO2=BSNO2+1

COMPUTE     BSN31=0
IF          (BN3O1 LE BN32)    BSN31=BSN31+1
IF          (BN3O1 LE BN32 AND BN32 LE BN33)
            BSN31=BSN31+1.
```

(3) The order of BN42, BN43, BN44 (i.e. $\alpha_{41}(\beta_1)$, $\alpha_{41}(\beta_2)$, $\alpha_{41}(\beta_3)$)

```
COMPUTE     BSNO3=0
IF          (BN42 GE BN43)   BSNO3=BSNO3+1
IF          (BN42 GE BN43 AND BN43 GE BN44)
            BSNO3=BSNO3+1
```

The following tables shows the cross-tabulation of BSNO1 BSN31 AND BSNO3 by EDUC (1,2) (Two sample groups: F.2 and F.4).

BSNO1

EDUC		0	1	2	ROW TOTAL
1	COUNT	4	10	15	29
	ROW PCT	13.8	34.5	51.7	56.9
	COL PCT	40.0	58.8	62.5	
	TOT PCT	7.8	19.6	29.4	
2	COUNT	6	7	9	22
	ROW PCT	27.3	31.8	40.9	43.1
	COL PCT	60.0	41.2	37.5	
	TOT PCT	11.8	13.7	17.6	
COLUMN TOTAL		10 19.6	17 33.3	24 47.1	51 100.0

BSN31

EDUC		0	1	2	ROW TOTAL
1	COUNT	1	2	26	29
	ROW PCT	3.4	6.9	89.7	56.9
	COL PCT	100.0	28.6	60.5	
	TOT PCT	2.0	3.9	51.0	
2	COUNT	0	5	17	22
	ROW PCT	0	22.7	77.3	43.1
	COL PCT	0	71.4	39.5	
	TOT PCT	0	9.8	33.3	
COLUMN TOTAL		1 2.0	7 13.7	43 84.3	51 100.0

BSNO3

EDUC		0	1	2	ROW TOTAL
1	COUNT	3	1	25	29
	ROW PCT	10.3	3.4	86.2	56.9
	COL PCT	75.0	16.7	61.0	
	TOT PCT	5.9	2.0	49.0	
2	COUNT	1	5	16	22
	ROW PCT	4.5	22.7	72.7	43.1
	COL PCT	25.0	83.3	39.0	
	TOT PCT	2.0	9.8	31.4	
COLUMN TOTAL		4 7.8	6 11.8	41 80.4	51 100.0

TABLE 6.22 BSN - Analysis: The Order of Some BN Indices

6.4 London Study: Relationships Between MDT Forms A and B (Part I only)

Two F.2 classes (27 and 28) completed the Part I of both MDT Forms A and B. (For details of the sample, see Table 5.5 in Section 5.3). They are used for studying the relationships between MDT Forms A and B. It is emphasized here once more that MDT Forms A and B are not alternative forms (See Section 5.4).

As mentioned before, since the item "Car Accident" appears in both Forms A and B, subjects were normally asked to answer this item in their first MDT. For convenience of discussion, this item is used for generating NR indices in Form A but not the BXR in Form B. That is, the BXR indices of Form B in this case are constructed from the following four items only: "The Young Robber", "Freedom of Speech", "Bank Robbery" and "Civil War" (Short Version).

The correlations between the NR (Form A) and BXR (Form B) indices are in the 0.40s. (See Appendix 6.4).

TABLE 6.23 Pearson Correlations: MDT Form A with MDT Form B

P E A R S O N C O R R E L A T I O N

	CTF	CTG	CTH	CTK
CTA	-.1624	.0898	-.2370	.0789
	(44)	(44)	(44)	(44)
	S= .146	S= .281	S= .061	S= .305
CTB	.1013	-.0950	-.0496	-.2137
	(44)	(44)	(44)	(44)
	S= .256	S= .270	S= .375	S= .082
CTC	.0293	.2430	-.0458	.2786
	(44)	(44)	(44)	(44)
	S= .425	S= .056	S= .384	S= .034
CTD	.3486	-.0518	-.2588	-.2940
	(44)	(44)	(44)	(44)
	S= .010	S= .369	S= .045	S= .026
CTE	-.0066	-.0133	.5444	-.0805
	(44)	(44)	(44)	(44)
	S= .483	S= .466	S= .001	S= .302

P E A R S O N C O R R E L A T I O N

	BN15	BN29	BX38	BN46	BN51
N16	.1892	.0825	.0520	-.2065	-.0876
	(44)	(44)	(44)	(44)	(44)
	S= .109	S= .297	S= .369	S= .089	S= .286
N36	-.0707	-.0139	.4425	-.3258	-.0301
	(44)	(44)	(44)	(44)	(44)
	S= .324	S= .449	S= .001	S= .015	S= .423
N415	.0043	-.0186	-.3514	.3724	-.0549
	(44)	(44)	(44)	(44)	(44)
	S= .489	S= .452	S= .010	S= .006	S= .362
N51	-.3929	-.2388	.1224	.1013	.3652
	(44)	(44)	(44)	(44)	(44)
	S= .004	S= .059	S= .214	S= .257	S= .007

(COEFFICIENT / CASES / SIGNIFICANCE) (99.0000 MEANS UNCOMPUTABLE)

6.5 Hong Kong Study

An analysis similar to that given in Section 6.2 was carried out using the Hong Kong (Chinese) sample described in Section 5.3(II). The following notes apply to the Hong Kong study:

(1) The Rejecting Criteria RC-I-2 and RC-II-2 are applied to all the analyses (MDT Parts I and II) unless otherwise specified.

(2) There are no test-retest reliability and validity studies in this case.

(3) The general descriptions in Section 6.2 apply to the corresponding analyses here unless otherwise specified.

(4) Only subjects from Schools C1 to C4 are used in the general analyses. Subjects from School C5 are used mainly in the study of sex differences.

(5) In order to save space, only part of the major results are presented here. Refined details and the results of other analyses are all given in Appendix *6.5*, which is prepared in the form of microfiche.

6.5.1 Internal Consistency Reliability of the MDT

TABLE 6.24

Internal Consistency Reliability: Hong Kong Study

A. Treating the N and J-indices as Variables or Scores

	r	σ_i	σ_{meas}
N16	0.884	1.256	0.428
N36	0.605	0.658	0.414
N415	0.884	0.820	0.279
N51	0.607	0.984	0.617
J2	0.258	0.611	0.526
J3	0.591	0.543	0.347
J4	0.515	0.480	0.334
J5	0.548	0.457	0.307
NRRJO1	0.872	3.32	1.188
NRRJO2	0.853	4.02	1.541
NRRJO3	0.837	4.77	1.926
Average NRRJ	0.854	na	na
WNRRJO1	0.842	3.71	1.475
WNRRJO2	0.829	4.52	1.869
WNRRJO3	0.818	5.38	2.295
Average WNRRJ	0.830	na	na

B. Treating the NRJ or WNRJ indices as variables or scores

	Γ	σ_i	σ_{meas}			σ_i	σ_{meas}
NRJ2	0.809	0.844	0.369	WNRJ2	0.766	0.882	0.427
NRJ3	0.712	0.528	0.238	WNRJ3	0.721	0.619	0.327
NRJ4	0.879	0.650	0.226	WNRJ4	0.869	0.691	0.250
NRJ4	0.519	0.433	0.300	WNRJ5	0.519	0.552	0.383
NRJO1	0.968	3.32	0.594	WNRRJO1	0.968	3.71	0.684
NRJO2	0.965	4.02	0.752	WNRRJO2	0.966	4.52	0.833
NRRJO3	0.962	4.77	0.930	WNRRJO3	0.964	5.38	1.021
Average NRRJ	0.965	na	na	Average WNRRJ	0.966	na	na

Notes:

(1) The sample consists of 16 F.4, 129 F.5, 30 F.6 and 21 adult subjects. The total N=196.

(2) Rejecting Criteria used:
REJECT IF (MCTALL LT 48 OR MJALL LT 42)

(3) See also notes in Table 6.5.

(4) For internal consistency reliability of CT, N, NR, J and RJ indices, see Appendix 6.5(A).

6.5.2 The Hierarchical Order of the N-indices

A qualitative analysis of the MDT item responses is given in Appendix 6.5(B). The means and standard deviations of some important N-indices are given in Appendix 6.5(C). These means are plotted on the following graphs for illustrative purpose.

Figure 6.3 The order of the means of some important N - indices: Hong Kong Study

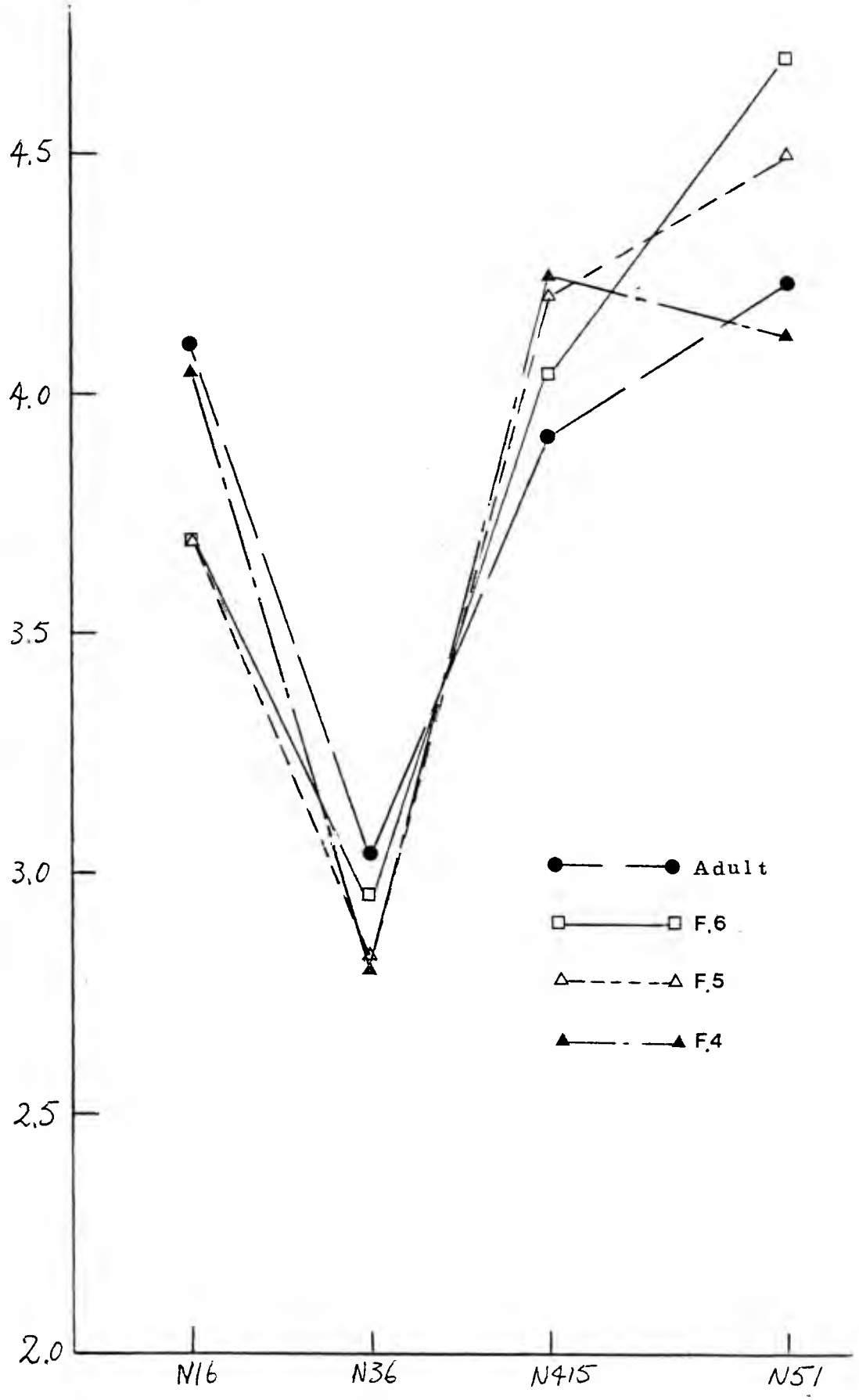
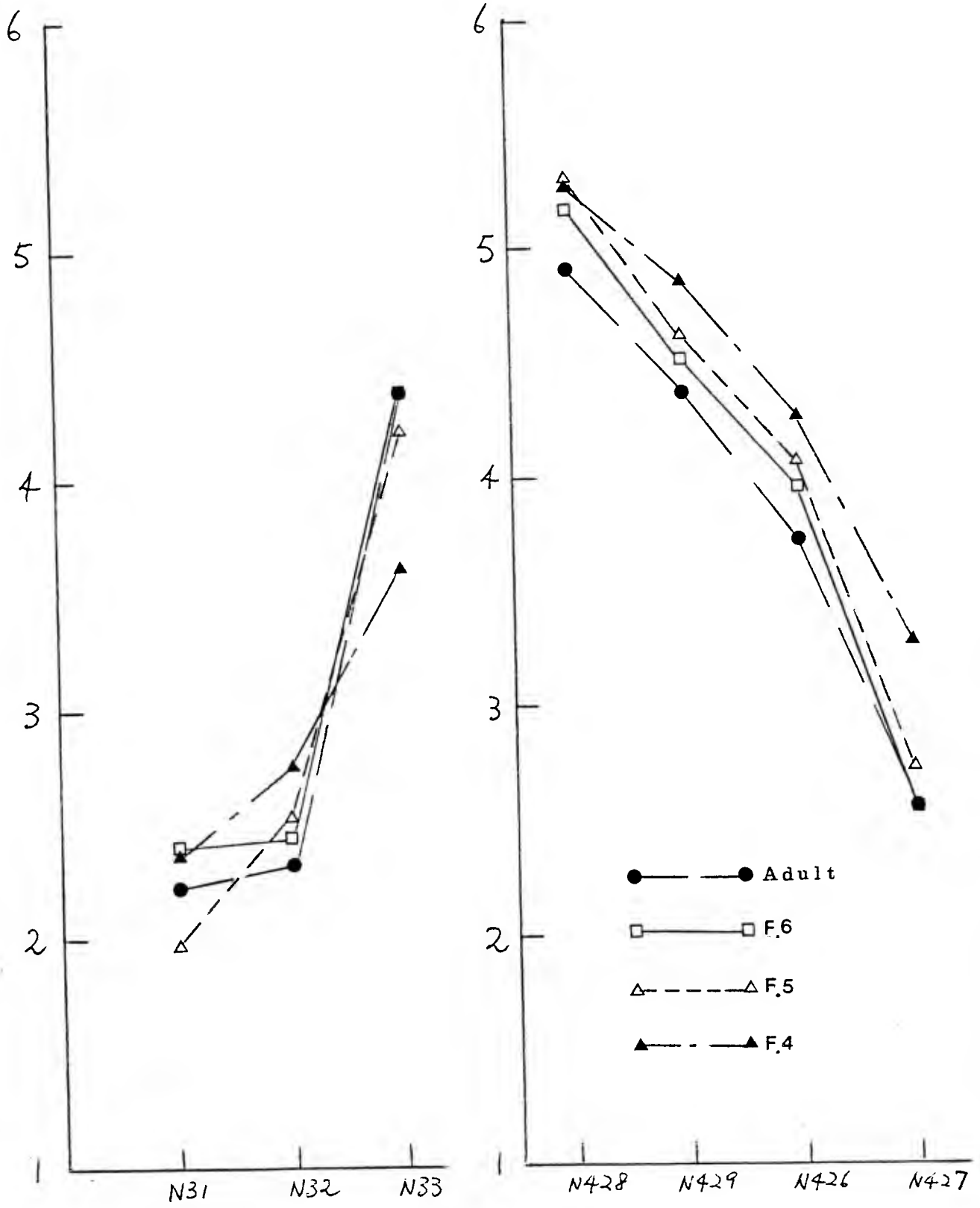


Figure 6.3 (Continued)



6.6. A Cross-cultural Study of the English and Chinese Samples

The following comparative analyses were performed:

(1) t-test of the means of the major MDT indices

(2) Evaluation of the cross-cultural indices of the major MDT indices. According to Ma (1980, p.77-79), the computation of the cross-cultural indices is as follows:

> Consider a cross-cultural study of a certain test using the samples S_1 and S_2. A t-test for each of the items of the test is computed. The t-value for each item is given by:
>
> $$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{\sigma_1^2}{N_1} + \frac{\sigma_2^2}{N_2}}}$$
>
> where X_1 = Mean score of S_1
> X_2 = Mean score of S_2
> σ_1 = Standard deviation of the scores of S_1
> σ_2 = Standard deviation of the scores of S_2
> N_1 = Number of subjects in S_1
> N_2 = Number of subjects in S_2
>
> Cross-cultural index, C.I ($p \leq 0.05$) =
>
> $$\left\{ 1 - \frac{\text{Number of items with t-values significant at 5\% level}}{\text{Total Number of items}} \right\}$$
>
> Similarly, C.I. ($p \leq 0.01$) at 1% level can be defined.
>
> It is important that the cross-cultural indices should be generated by responses given by two comparable samples, that is, samples of similar characteristics. The criterion for assessing the comparability of two samples may be quite different for different tests. In general, the age is regarded as a fairly good criterion variable for developmental tests.

Both analyses (1) and (2) were carried out separately for the following sample groups:

(a) English F.4 - F.6 groups with
Chinese F.4 - F.6 groups

(b) English adults with Chinese adults.

TABLE 6.25 A Cross-cultural Analysis Using the English and Chinese Samples

A. T-Test

	F.4 - F.6			Adults		
	t	P		t	P	
CTA	-3.12	0.002	**	0.19	0.853	
CTB	0.33	0.742		0.47	0.643	
CTC	-0.66	0.509		0.97	0.339	
CTD	4.78	0.000	***	-0.22	0.829	
CTE	0.14	0.886		0.28	0.780	
N16	-1.49	0.136		-0.76	0.451	
N36	0.41	0.683		0.44	0.658	
N415	1.85	0.065		0.52	0.604	
N51	0.84	0.403		-0.78	0.439	
J1	-2.28	0.023	*	-0.81	0.419	
J2	-3.33	0.001	***	-0.26	0.795	
J3	1.14	0.253		3.37	0.001	***
J4	9.84	0.000	***	5.06	0.000	***
J5	2.16	0.032	*	2.24	0.030	***
NRO3	1.31	0.192		-0.21	0.834	
RJO3	5.35	0.000	***	1.23	0.224	
NRRJO3	2.96	0.003	**	0.15	0.884	
WNRRJO3	3.46	0.001	***	0.28	0.782	

Notes:

(1) The sample consists of (i) 175 English and 232 Chinese F.4 - F.6 subjects, and (ii) 48 English and 25 Chinese adults.

(2) A positive t implies the means of the English sample is larger than that of the Chinese one, Negative means the reverse.

(3) *$p \leq 0.05$ **$p \leq 0.01$ ***$p \leq 0.001$

B. Cross-cultural Indices

	F.4 - F.6		Adults	
	C.I.(5%)	C.I.(1%)	C.I.(5%)	C.I.(1%)
CTA	0.500	0.667	0.667	1.000
CTB	0.625	0.875	0.875	1.000
CTC	0.667	0.667	0.667	1.000
CTD	0.333	0.555	0.778	0.889
CTE	0.790	0.842	0.895	0.947
N16	0.555	0.778	0.889	1.000
N36	0.786	0.786	0.929	1.000
N415	0.633	0.700	0.800	0.933
N51	0.714	0.714	0.714	1.000
J1	0.333	0.667	0.667	0.667
J2	0.400	0.800	0.600	0.800
J3	0.400	0.500	0.600	0.600
J4	0.167	0.333	0.500	0.583
J5	0.733	0.733	0.800	0.867
NRO3	0.625	0.750	0.813	0.958
RJO3	0.444	0.578	0.644	0.711
NRRJO3 or WNRRJO3	0.538	0.667	0.731	0.839

Notes:

(1) The sample used is same as that in (A)

(2) In the computation of the C.I.s of the NRO3, NRRJO3 and WNRRJO3 indices, item responses are counted once only even though they may appear more than once in the indices.

More cross-cultural findings including the Malaysian Sample, are given in Appendix 6.7.

7. Discussion

This chapter concentrates mainly on the discussion of the empirical results and findings reported in Chapter 6. Generally speaking, two main types of discussion are given here:

(1) General descriptions which summarize the statistical results and point out the major features of the statistical analyses performed. In some sense, this kind of discussion is a direct and explicit overview of the statistical results; it is basically inductive.

(2) Heuristic discussions which attempt to explain empirical results. Induction, deduction and speculation will be used in this case. It should be emphasized here that, in some cases, the heuristic discussion goes far beyond the scope covered by the empirical data. It will be noted clearly in the discussion where such cases arise.

7.1 Limitations of the Present Study

In general, there are three major limitations of the present empirical study:

(1) None of the samples used here can be regarded as completely randomized. Though the attempt was made to get randomized samples as far as possible in the process of data collection, the results have not been satisfactory. There are two major biases in the

samples used here:

(a) The number of school-children subjects is much larger than that of the adult subjects. This is mainly due to the difficulty in getting adult subjects to fill in a long and personal questionnaire such as the MDT. (See Section 5.5(I)).

(b) The adult sample is more biased than the school-children sample in many aspects. First of all, the return rate of the adult sample is about 25% while more than 90% of the school-children present in the testing sessions completed the tests. Secondly, most of the children of the same age as those in the F.2 - F.4 samples used in the present study are similar in educational background and almost all of them attend secondary schools. On the other hand, the adult sample used here consists of highly educated university students and was therefore drawn from a population which was homogeneous in background but in no sense representative of the whole adult population. The degree of bias of the F.6 sample probably lies between that of the F.2 - F.4 and the adult samples.

(2) As mentioned in Section 6.1, it is necessary to employ a set of Rejecting Criteria for screening Subjects in order to minimize the amount of noise in the data. It is possible that the characteristics of the subjects rejected from the analysis is quite

different from that of those accepted for the analysis. It will not be possible to check this point in the present study.

(3) There are also a few problems in the cross-cultural studies:

(a) As mentioned in section 5.2(I-B), the order of the test items in the Chinese MDT Form A(4) is exactly the reverse of that in the English MDT Form A. This means that one extra factor, namely, the order of the test items, is introduced in the cross-cultural studies. Though it is assumed that the order of the test items has no effect on the results, there is no empirical data to support this claim in the present study.

(b) As mentioned in Section 5.3(III), the Malaysian subjects answered the English version of the MDT. In other words, they did not answer the MDT in their mother language. This implies that the results of the cross-cultural analysis involving the Malaysian subjects may be less reliable.

In addition, the MDT attempts to explore the fundamental features of moral development up to the N_5 and J_5 levels only, while the theory (i.e *TMD) postulates a seven-stage model.

7.2 The Psychometric Properties of the MDT

I. Reliability of the MDT

Most of the psychometric properties of the MDT Form A are intensively investigated in the London Study only.

Since the MDT employs a standard method of test administration and an objective method of scoring, mainly carried out by computer, there is no problem in the scoring bias or inter-rater reliability. Two major types of reliability of the MDT are discussed as follows:

(A) Test-retest Reliability

According to the third column of Table 6.4(A), the average test-retest reliability (r_{tt}) of CT, N and NR indices are 0.700, 0.776 and 0.832 respectively. (See Note 2 at the end of Table 6.4(B) for the explanation of the meaning of the "average" r_{tt}) Similarly, according to Table 6.4(B), the average r_{tt} of J and RJ indices are 0.759 and 0.657 respectively. Results in Appendices 6.2(A) and 6.2(B) are lower: the average r_{tt} of the NR indices including the Class 21 drops to 0.714 and that of the RJ indices for Class 42 including the subject who showed an extremely reverse Part II response pattern in the retesting data is 0.436. Above all, the average r_{tt}

of the NRRJ and WNRRJ indices in Table 6.4(B) and Appendix 6.2(B) are both in the 0.90s.

Judging the above results, it is concluded that subjects' responses in the MDT Part I are more stable than those in the Part II over a short time period (14-20 days). It is also claimed that the MDT as a whole is a reliable test.

(B) Internal Consistency Reliability

The internal consistency reliability (r_i) of the NRRJ and WNRRJ indices calculated by (a) treating the N and J indices as variables and (b) treating the NRJ/WNRJ indices as variables is in general high. Method (a) gives an average r_i in the 0.80s and method (b) 0.90s (see Tables 6.5 (London Study) and 6.24 (Hong Kong Study)). The average r_i of NR indices is usually in the 0.80s but the average r_i of RJ indices is 0.238 in London Study (Appendix 6.2(D)) and 0.467 in Hong Kong Study (Appendix 6.5(A)). It should be noted that the r_i of both of the N36 and N51 indices are lower than the r_i of the other two N-indices, and the r_i of the J2 index is the lowest in the set of J-indices in both the studies (See Tables 6.5 and 6.24).

The average r_i of the BNR indices of the MDT Form B (Part I) is 0.803 (See Table 6.20).

In addition, the standard errors of measurement of the NRRJ and WNRRJ indices are usually low (See Tables

6.5 and 6.24). Dividing the standard error of measurement by the possible range of the NRRJ or WNRRJ indices leads to a value of 0.03 or 0.04 (i.e. 3 to 4%). For example, the range of NRRJ01 is from -20 to +20 (i.e. range = 40) and σ_{meas} = 1.195 (from Table 6.5(A)); dividing 1.195 by 40 gives a value of 0.0299 or 2.99%.

It is thus concluded that the MDT is an internally consistent test and that MDT Parts I and II act as a complete whole. Separating the MDT into two parts results in a high internal consistency reliability for Part I but a remarkably low internal consistency reliability for Part II.

As seen from the discussion above, the MDT Part II cannot be regarded as a separate whole by itself. This is perhaps due to the internal design of the MDT which requires the subjects to answer Part I first and then to judge the Part II statements based on their Part I responses. In other words, the Part II responses are intrinsically and closely tied to the Part I answers. That is to say, the present MDT design does not allow the study of the structure of Judgment to be carried out as a separate structured whole by itself. Though this does not necessarily imply that the structure of judgment (J) can only be studied properly in conjunction with the N(R) structures, it does imply that the affective or ordinary J, in contrast to the rational or optimal J (See Section 3.4), is better to be investigated as a part of the N(R)-J whole. That

the optimal J can be studied as an integrated whole by itself (See Section 2.3 for a discussion of the Cognitive Development Approach, which studies the optimal J as an integrated structure by itself) is probably due to the fact that the optimal J is more cognitive oriented, and less affective-oriented or less related to the N(R) structure than the ordinary J.

II. Relationships among MDT items and Relationships Between MDT Forms A and B (Part I only)

(A) MDT Items

The relationships among the nine MDT items are studied by examining the correlations (Γ) between the CT scores across three samples (See Appendix 6.2(6) and 6.3 and Table 6.23)

TABLE 7.1 Correlations Between the MDT items

	$\Gamma \geq 0.4$	$0.4 > \Gamma \geq 0.2$	$-0.2 \geq \Gamma > -0.4$	$-0.4 \geq \Gamma$
Form A	(CTB,CTD)***	(CTA,CTC)*** (CTB,CTE)*** (CTC,CTD)***		(CTA,CTE)***
Form B	(CTD,CTF)***			
Form A & B	(CTE,CTH)***	(CTC,CTG) (CTC,CTK)* (CTD,CTF)**	(CTA,CTH) (CTB,CTK) (CTD,CTH)* (CTD,CTK)*	

Notes:

(1) (CTB,CTD) means correlation between CTB and CTD. Other correlations are similarly defined.

(2) * $p \leq 0.05$ ** $p \leq 0.01$ *** $p \leq 0.001$

(3) Form A analysis comes from Appendix 6.2(6), Form B analysis from Appendix 6.3 and Forms A and B analysis from Table 6.23.

(4) Only correlations fall between the range indicated are shown.

(5) (CTA,CTB) = -0.1813 ($p = 0.001$)

It should be noted that CTD appears in all the three analyses. However, the samples used in the Form B alone and Forms A & B analyses are so small (See Section 5.3(I)) that the results are probably less representative; for example, the (CTD,CTH) is -0.2588 ($p = 0.045$) in the Forms A & B analysis (See Appendix 6.4) but is 0.0276 ($p = 0.423$) in the Form B analysis (See Appendix 6.3). In general, the results of Form B are less stable and less reliable.

In the interpretation of the Table 7.1, it is important to note that the "sign" of the central themes of the items 'E' (The Criminal) and 'H' (Bank Robbery) is negative (See Table 4.5 and Note (2) at the end of the table). In addition, as mentioned in Section 4.3-4, the central theme of the item 'Civil War' is not as unique and simple as the other items. According to the above findings, it turns out that the CTK has a positive correlation with CTC and a negative correlation with either CTB or CTD. This is fairly consistent in some sense because (i) Both CTC and CTK are concerned with a dilemma between

one's care and affection for others (foreigners and family respectively) and one's self-esteem and conformity to social norms. (ii) It seems that the items "B" and "D" pose a straight forward dilemma for the subjects, which is mainly concerned with one's strong affection for one's family members and friends and the weak. On the other hand, the X_1 and X_5 of the item "K" presents a much more difficult situation which cannot be solved merely by an altruistic or affective decision but requires a hard choice between (i) the benefit or right of one's daughter and the rest of one's family in X_1 and (ii) the benefit or the right of other people and one's family in X_5. This basic difference between CTK and CTB or CTD is possibly expressed by the moderately negative correlations (CTB, CTK) and (CTD,CTK)*. However, the above interpretations are confounded by at least three aspects: (i) the internal consistency reliability of CTK is only 0.182 because of the item response X_4. (ii) the Sample used is small and consists of mainly young school-children. (iii) Young subjects often neglect the right of the stranger from the bus in item "D". In short, item "K" requires more future extensive study.

The following discussion concentrates on the MDT items in Form A analysis:

(1) From Table 7.1, CTA is positively correlated with CTC and negatively correlated with CTB and CTE. Taking the negative sign of the central theme of the item "E" into consideration, CTA bears a positive relation with

CTC and CTE, and a negative one with CTB. Since the central themes of CTA, CTC and CTE are either N_4 or N_5 and that of CTB is N_1, the results are regarded as consistent.

(2) Similarly, CTB bears a strong positive relation with CTD and a negative relation with both CTA and CTE. The explanation of the negative relation is the same as that given in (1). The strong positive relation between CTB and CTD is mainly due to the strong similarity of the central themes of the X_is in both items, namely, the strong affection for one's family members and friends, and the weak.

(3) CTC correlates positively with both CTA and CTD. The moderate correlations may be accounted for by the fact that items "A", "C" and "D" all involve a dilemma between one's affection for one's family members and friends, and one's conformity to social norms or one's motivation for self-actualization.

As far as the MDT Form A is concerned, the central themes of the MDT items are not completely different from one another, however, they cannot be regarded as identical or equivalent. Each of the MDT items measure some common fundamental factors but each of them also measures some distinguishing refined features of their own.

(B) Forms A and B

As mentioned before, MDT Forms A and B are not

alternative forms. According to the results reported in Section 6.4, the correlations (N16, BN15), (N36, BX38), (N415, BN46) and (N51, BN51) range from 0.1892 to 0.4425. In addition, the correlations between NR and BXR indices are usually in the 0.40s.

Since the sample used in the study of Form B is so small, it is difficult to draw a firm conclusion at this stage. Very roughly speaking, the MDT Form B can be said to be quite similar to the MDT Form A, though they cannot be regarded as equivalent forms.

III. Validity of the MDT

Broadly speaking, all the validity studies performed here deal with construct validity. That is, a set of internal criteria is set to test how good the MDT is in the study of moral development, or more specifically, in the study of the Theory of Moral Development (*TMD) established in Chapter 3. It is also emphasized that the scope of the present validity study is restricted.

Psychologists do not usually agree over a universal set of validity criteria for a test (See e.g. Nunnally, 1978, p.86-113; Thorndike and Hagen, 1977, p.56-73; Rest, 1979b, p.96-100). The following discussion deals with the commonly accepted validity criteria in moral research.

(1) Face Validity

Specifically speaking, the face validity of the MDT is related to the question of how appropriate are the MDT items in the study of moral development. Moreover, why some item responses are claimed to measure the higher stages of moral development and why some measure the lower stages. In other words, what is the rationale underlying the selection of the MDT item tasks for the study of moral development? All these questions have been dealt with in detail in Chapter 4.

As far as the argument in Chapter 4 is concerned, it is claimed that the MDT appears to have good face validity.

(2) Reliability

One important aspect of the construct validity of a test is its psychometric reliability. As noted in Section I, the test-retest reliability and internal consistency reliability of the MDT is high.

(3) Convergent-divergent Validity

The correlations between the MDT and other tests should give a consistent pattern. It is expected that the MDT correlates positively with other tests of moral development, and to a less extent with other cognitive development tests. On the other hand, the MDT is not, in general, expected to correlate significantly with tests which do not bear a positive relation with the moral or social development.

A discussion of the covergent-divergent validity and more refined aspects of the construct validity of the MDT will be carried out at the end of next section, after a discussion of the hypothesis testing, and also in Section 7.4.(I).

7.3 Testing the Theoretical Hypotheses

The following discussion is based on the results of the London and Hong Kong studies of the MDT Form A. The set of hypotheses in Section 5.1 will be discussed in its original order. For convenience of discussion, each hypothesis is given a title which appears in the bracket. The following abbreviations are used: E = English; C = Chinese; Es = English subjects and Cs = Chinese subjects.

H.1.1. (X_i-Hierarchy)

The following discussion is a rough overview and summary of the results of the qualitative analysis of the MDT Form A items (See Figure 6.1 and Appendix 6.5(B)).

(1) Item A: A Lost Bag

In general, the patterns agree with the theoretical hierarchy postulated in Equations (4-1) or (4-2) except that the order of X_5 and X_1 in (4-1) should probably be reversed.

(2) Item B: The Sinking Boat

Apart from two major differences between the Es and Cs, the patterns agree with Equation (4-3). The first difference is on X_8 (a child, 6 years old); while the Cs in general (except the F.4 group) rated X_8 as less important than X_5 (best friend), the Es did the reverse (except the F.6 group). This might imply that the Cs rated their friends as less important than a helpless child but the Es tended to do the reverse in this case. Secondly, the Cs in general rated X_3 (a Nobel prize winner) as much more important than an old stranger while the E ratings are not so clear-cut. The English F.2 group in general rated X_3 as less important than X_2; the F.3 group rated X_2 and X_3 as approximately equal; and the F.4, F.6 and Adult groups rated X_3 as slightly more important than X_2. This result is interesting. One of the reasons may be due to the fact that no native Chinese has been awarded a Nobel Prize so far (though there are three American Chinese Nobel Prize Winners in Physics) but there are a number of British Nobel Prize Winners.

(3) Item C: A Doctor's Dilemma

The general results agree with Equation (4-4) except a violation of X_1 in the F.6 and adult Cs.

(4) Item D: Car Accident

The general patterns agree with Equation (4-6) except an obvious violation of X_9 (a Nobel Prize Winner) in the Cs. The argument for this violation is similar to that given in (2).

(5) Item E: The Criminal

The overall patterns agree with Equation (4-7) except sub-situation S4 in the F.4 Cs. This may be due to either sample characteristics or a misunderstanding of the central theme of the sub-situation S4. It is interesting to note that the general patterns go up from left to right with the exception of the adult groups. Both E and C adults rated the S4 smaller than the S5 while the younger subjects did the reverse.

Judging the above results, it is concluded that hypothesis H.1.1 is empirically supported in both the London and Hong Kong studies.

H.1.2 (N(R) Hierarchy)

Based on the results presented in Table 6.6, Figures 6.2, 6.3 and Appendix 6.5(C), it is claimed that, as far as the means of the relevant N(R) indices are concerned, hypothesis H.1.2 is empirically supported. It should be noted that the mean of the N16 index usually falls between the means of the N36 and N415 indices in most of the sample groups.

In addition, the results of the SN (See Table 6.7 and Appendix *6.5*) and TRC (See Table 6.11 and Appendix *6.5*) analyses also lend some support to the claim of the N(R) Hierarchy. A few points are elaborated as follows:

(1) In the SNO1 (N36 $\leq$ N415 $\leq$ N51) Tables, both the E and C results show a total of more than 85% of the subjects rate the 3N indices as N36 $\leq$ N415 and more than 45% as N36 $\leq$ N415 $\leq$ N51. The latter percentage is low. The small discrimination between the N415 and N51 may probably be due to the diversified background of the vast number of item responses, a total of 30, that compose the N415 index. This may in turn be due to the defect of the 'Central Theme Analysis' and the problem of 'Relativistic Value' discussed in Section 4.3.1.

(2) The SNO2 and SNO3 results are much better. 64.2% and 68.3% of the Es, and 66.5% and 71.6% of the Cs obey the complete hierarchical order of SNO2 and SNO3 respectively.

(3) The TRC scores are in general in the 0.60s and 0.70s. (See Table 6.11 and Appendix *6.5*) except the TRC05 which is 0.5437 for the Es and 0.6280 for the Cs. The average of the first four items, TRC1234 is 0.6756 for the Es. It should be noted that there is no rankings in item "C" for the Cs. (See Section 5.2)

Combining the results of H.1.1 and H.1.2, it is claimed that the general features of the N(R) hierarchy are justified empirically. However, there is no reason to believe and no data to support that the N(R) hierarchy is true for <u>all</u> persons and <u>all</u> cultures. What is claimed here is that the hierarchy is true for the majority

of people; the percentage in each culture, or in each sample, is to be determined empirically.

The following heuristic discussion inspired by the above empirical findings is speculative. It is believed that moral behaviour in real life situations would follow the N(R) hierarchy more closely than the above empirical data. It is even thought that apart from a number of exceptionally anti-social, extremely emotionally unstable, or mentally unbalanced people, most of us act in real life situation in accordance with the hierarchy postulated. Reasons why some subjects provide responses which do not obey the N(R) hierarchy are suggested as follows;

(1) The MDT is not entirely satisfactory in eliciting true responses similar to those engaged in real moral behaviour.

(2) Subjects tend to prefer high stage responses. Some of them may be inclined to answer the MDT questions as "what one should do" rather than "what one would do". The latter is what the test asks for. In addition, some of them may tend to give responses that are more likely to be socially approved or reinforced. In short, subjects are believed to be more altruistic, more idealistic and less ego-centric in the hypothetical situations than in the real-life situations.

(3) A number of subjects who were suspected of giving faking responses or misunderstanding, the test instructions are not rejected from analysis because they

passed all the Rejecting Criteria set in Section 6.1. For example, a few subjects who rated enemy and stranger as more important than the parents and friends in items "B" and "D" have not been rejected.

H.2.1 and H.2.2 (Structured Wholeness Hypothesis).

A. Internal Consistency Reliability

As mentioned in Section 7.2(I), the internal consistency reliabilities of the NRRJ and WNRRJ indices in both the E and C studies are in the 0.90s. In general, the high internal consistency reliability of the MDT supports that the N(R)-J stage structures as measured by it form structured wholes. In addition, the high test-retest reliability of the above indices (also in the 0.90s) also lends some support to the structured whole claim.

It has been found that the internal consistency reliability of the NR index is usually in the 0.80s while that of the RJ index is in the 0.20s for the Es and 0.40s for the Cs. In other words, while the N(R) structures can be said to form structured wholes by themselves, the J structures as measured by the MDT do not. (See also Section 7.2(I)).

B. Factor Analysis

In general, Principal Component Analysis (SPSS FACTOR, TYPE = PA1) was performed though in some cases Principal

Factoring with Iteration (TYPE = PA2) was also employed. The following discussion is based on the results reported in Sections 6.2.4 and 6.2.8 and Appendix *6.5*.

A complete set of factor analysis of the MDT data usually includes the factor analysis of (a) N16, N36, N415, N51 (abbreviated as 4N) indices (b) J2, J3, J4, J5 (abbreviated as 4J) indices (c) N16, N36, N415, N51, J2, J3, J4, J5 (abbreviated as 4N + 4J) indices.

(a) Factor Analysis of the 4N indices

Generally speaking, the correlation pattern of the 4N indices is similar in both the E and C studies. All the correlations are negative except the pair (N415, N51). The eigen-values of the first two principal factors are greater than one. In addition, the first two principal factors accounts for more than 70% of the variance. This implies that a two-factor analysis is appropriate in this case. With a two-factor analysis, the unrotated principal factor loadings for the 4N indices fall on different quadrants of a plot with Factor 1 as the horizontal axis and Factor 2 as the vertical axis. This supports that a two-factor pattern clearly expresses the distinguishing features of the 4N indices.

(b) Factor Analysis of the 4J indices

Strictly speaking, the correlation matrix does not form a simplex-like pattern because of two discrepancies.

That is, not all the correlations in the pattern decrease away from the diagonal along a row or a column. In the E pattern, the two discrepancies are: (i) (J2, J3) < (J2, J4) and (ii) (J3, J4) < (J3, J5); while in the C pattern, the discrepencies are: (i) (J3, J4) < (J3, J5) and (ii) (J3, J4) < (J2, J4). The correlation pattern is thus regarded as fairly simplex-like.

The first two factors in both studies have eigen-values in the high 1.90s and 0.80s, and they account for about 70% of the variance. A two-factor principal component analysis leads to, in general, three 'clusters' in the unrotated principal factor pattern (Factor 1: horizontal axis and factor 2: vertical axis): (i) E pattern: the J2 is at the top, J3 and J4 together in the middle and J5 at the bottom. (ii) C pattern: the J2 and J3 together in the first quadrant and the J4 and J5 both in the fourth quadrant (i.e. the one just below the first quadrant). Apart from some minor differences, the loadings of the second factor appears to arrange themselves in a descending order with higher loading for the J2 and lower loading for the J5.

In the explanation of the internal structure of the DIT, Davison (1977, 1979) argues that the first principal factor of a two-factor principal component analysis of the stage scores should be positive and the second factor should have factor loadings ordered according to the stage order postulated. He also argues that high stage score should

have high factor loading in the second principal factor and low stage score should have low loading. It is argued that Davison's last argument that high stage score should have high factor loading etc. is not a statistically necessary condition for the demonstration of an ordered sequence of the variable J. The reason can be illustrated clearly by the following argument; one fixed simplex-like pattern can be formed without causing internal inconsistencies by (i) J2, J3, J4 and J5 variables in its original order, and (ii) the same J variables in exactly the reverse order. That is, one fixed simplex-like correlation matrix can be formed by (i) (J2,J3,J4,J5) X (J2,J3,J4,J5) or (ii) (J5,J4, J3,J2) X (J5,J4,J3,J2) patterns. This implies that the loadings of the second factor only reflect the monotonic nature of the order of the stage but not necessarily the direction of the order. In other words, if the variables Ji are arranged in the order postulated, the factor loadings of the second factor should be arranged in a monotonic increasing or decreasing order.

In short, the factor loadings of the J-pattern of the E and C studies arrange themselves in the desired order, with some small discrepancies, though the magnitudes of the correlations and factor loadings are different in both studies. It is also noted here that principal factoring analysis with iterations provides slightly better results in this case.

C. Factor Analysis of the 4N + 4J indices

The first three factors in both the E and C studies have eigenvalues greater than one and they account for 68

to 69% of the variance. A three-factor analysis was therefore performed.

Generally speaking, the correlation patterns in both the E and C studies are quite similar. The factor matrices (i.e. factor loadings of the first three unrotated principal factors) are fairly similar with the following differences in factor loadings: (1) more than 0.4 in J4 and 0.5 in N16 along Factor 1 (2) more than 0.3 in N16, N415, J4, J5 along Factor 1 and N415, J2, J3, J4 along factor 2. The above differences do not appear to alter significantly the basic features of the unrotated or rotated factor matrices.

In order to carry out a discussion of the results of the Factor Analysis effectively, the VARIMAX rotated factor matrix will be used. The VARIMAX rotation attempts to simplify the columns of a factor matrix, and thus the rotated factors in some sense express the different features of the 4N + 4J variables more clearly.

First of all, it should be noted that the rotated factors in the E and C studies (See Table 6.8 and Appendix *6.5*) should be interpreted as follows: (i) Factor 2 in E pattern is same as Factor 3 in C pattern
(ii) Factor 3 in the E pattern is same as the negative Factor 2 in the C pattern. Negative factor 2 is constructed by reversing the order or direction of the variables along the original axis of the factor 2; or by

rotating the original axis of the factor 2 through an angle of 180°. (iii) Factor 1 in both the E and C patterns are the same. Differences of similar nature also occur in the rotated factor matrices of the 4N + 4J variables using two different London samples (See Table 6.8, and Appendix 6.2.(J)). The above-mentioned differences are basically computational only; they do not affect the results at all.

The following discussion refers to the three rotated factor plots in Table 6.8. Exactly the same discussion can be applied to the rotated factor plots in Appendix 6.5 with the rotated factors interpreted in the way mentioned above. In general, the three rotated factors are interpreted as:

(a) Factor 1: Judgment: Social Conformity
(read the first plot from left to right)

This factor is said to account for rationalization in terms of social conformity. Three clusters can be identified along this factor: (i) N51, N16 : Both of these two indices are regarded as less social judgmental oriented; they are related to a person's self-autonomous and individualistic characteristics (e.g. one's self-actualization tendency and self-survival needs) (ii) N415, N36 : These indices are argued to have an affective peer-group or social group perspective, which is more social judgmental oriented than those two in (i). In other words, the perspectives underlying these two indices are more group-based and more

normative than those underlying the two indices in (i)

(iii) J2,J3,J4,J5 : In general, the J2 and J3 are always a little bit left of the J4 and J5, which are consistent with the postulated sequence of the Ji variables. On the other hand, the J4 appears to shift slightly to the right of the J5 in both the E and C plots and the J2 is also on the right of J3 in the C plot, which are not entirely consistent with the 4J sequence postulated.

The problem of the order of J4 and J5 may be accounted for by arguing that this factor is not a 'pure' rational judgmental one, it is concerned with an interaction between affective judgment and social conformity. In general, points towards the right of the plot are said to express a higher level of affective social judgment and a greater degree of social conformity. The problem of the order of J2 and J3 in the C plot may be due to sample characteristics.

Above all, it should be noted that this factor separates clearly the 4N variables from the 4J variables.

(b) Factor 2: Emotion: Affective and Rational Decisions
(read the first plot from top to bottom)

In general, points on the top are related to more emoted and affective decisions than those at the bottom of the first plot. Running from the top to the bottom, the pattern appears as: affective decision (N36) - affective judgment (J3) - physical survival (J2,N16) - self-acutalization (N51,J5) - rational social judgment (J4) - rational decision (N415). The pattern can be regarded as

internally consistent and reasonable.

(C) Factor 3: Motivation: Basic Psychological Needs
(read the second plot from bottom to the top)

Generally speaking, points at the bottom are related to the low level basic needs and motivations while those on the top are related to high level basic needs. The pattern appears as follows: survival needs (N16) - low level judgment (J2,J3) - high level judgment (J4,J5) - affective and social needs (N36, N415) - self-actualization needs (N51). It should be noted that low level judgments are towards the bottom where low level basic needs are found. The pattern is regarded as consistent with the theoretical hierarchy of N.

The interpretation of the refined details of the results of factor analysis is left open at this stage. It is claimed that the general results of factor analysis of the 4N + 4J variables support that the N(R)-J stage structures form structured wholes.

Combining the results of the reliability studies and factor analyses, it is thus concluded that the N(R) stage structures and N(R)-J stage structures form structured wholes. However, the low internal consistency reliability of the RJ indices implies that the affective J structures as measured by the MDT do not form structured wholes by themselves.

H.3. (Developmental Hypothesis)

Basically speaking, no developmental hypothesis can be fully and satisfactorily validated except by longitudinal studies. Since the present empirical study is an entirely cross-sectional one, the empirical findings here do not provide a direct and complete validation of the developmental hypothesis.

TABLE 7.2 A Summary of the Correlations Between Age and the Major MDT Indices

	Sample	N	Source	NRO3	RJO3	NRRJO3	WNRRJO3
(A)	London						
1	F.2,F.3,F.4,F.6,A.	434	T6.9	-0.2739	na	na	na
2	F.2,A.	183	A6.2(6)	-0.4465	na	na	na
3	F.3,F.4,F.6,A.	280	T6.9	-0.2752	-0.1593	-0.2868	-0.2840
4	F.3,A.	108	A6.2(G)	-0.3569	-0.2987	-0.3796	-0.3816
5	MDT-DIT	117	T6.18	-0.4502	-0.3482	-0.4667	-0.4624
(B)	Hong Kong						
	F.4,F.5,F.6,A.	250	T6.26	-0.1216 (P=0.027)	-0.1196 (P=0.029)	-0.1357 (P=0.016)	-0.1381 (P=0.014)

Notes:

(1) Abbreviations used: A (in the column 'Sample') = Adult
A (in the column 'Source') = Appendix
T = Table na = not applicable.

(2) All correlations in the London studies are significant with p = 0.001.

It should be noted that the MDT indices are constructed with 1 = Definitely YES to 7 = Definitely NO in Part I and 1 = Very Great Importance to 5 = No Importance in Part II, that is, small values of the indices imply a favour of the central theme of the indices. Since NR, RJ, etc. are constructed with high stage N or J minus low stage N or J, it thus means that a smaller value of the NR, RJ etc. represents a higher level response. In other words, a negative correlation between the age and NR, RJ etc. implies that the larger the age, the higher the level of the relevant stage structures as measured by NR, RJ etc.

According to Table 7.2, the age correlations (r) vary across different samples. Roughly speaking the correlations for the NRO3 and NRRJO3/WNRRJO3 are in the -0.30s, and the r for the RJO3 is in the -0.20s in the London study. The correlations in the Hong Kong study are somewhat lower, usually in the -0.10s.

The effect of age on the MDT indices is also shown in the Oneway Analysis of Variance of the indices by the variable EDUC (See Table 6.10 and Appendix 6.5(D)) and the AVOVA of the MDT indices by the variables AGE, SEX (See Table 6.16 and Appendix 6.5(D). The ranking indices RANKP and RANKR, which is constructed with a rationale that high score of these indices means high level of J (See Section 4.4.2), in general correlate significantly and positively with age (See Tables 6.13 and 6.18 and appendix *6.5*).

As far as the cross-sectional data are concerned, the results support a developmental claim of the major MDT indices.

One point needs further elaboration is that the age correlations for the MDT appear to be smaller than those for MMS and DIT. Both of them are usually in the 0.60s to 0.70s (See e.g. Rest, 1979b). Since the age correlations for the NR, RJ etc are significant with $p = 0.001$ in the London study, it is unlikely that the smaller correlations are mainly due to measurement errors; the reasons may be as follows: (i) the time for progressing to a higher N(R)-J stage is longer than that for progressing to a higher rational judgment level. (ii) most of the subjects in the present study fall in between a narrow range of the N(R)-J stages.

H.4 (N(R) and J Interaction)

The correlation between NRO3 and RJO3 is usually in the 0.40s (See Tables 6.9 and Appendix *6.5*). In addition, the oneway analysis of variance of the 4N indices by RJO3 always shows a strong significant linear trend in the direction predicted. That is, for low level N, the values decrease as RJO3 increases; for high level N, the values increases as RJO3 increases. On the other hand, the oneway analysis of variance of the 4J indices by NRO3 shows that there is a moderate linear trend for the J2 and J4 indices, a strong linear trend for J3 but no trend for

J5 (See Table 6.10 and Appendix 6.5(D)).

The general findings support that there is a strong and significant relation between the {4N, NR} and {4J,RJ} indices. The non-interactive nature of the J5 index with NRO3 requires further investigation.

H.5 (Cultural Universal Hypothesis)

The above discussions have been deliberately carried out in a way that the Hong Kong findings are put in parallel with the London findings. As far as the major findings are concerned, both studies are similar.

In addition, the cross-cultural index of the NRRJO3 or WNRRJO3 is moderately high (0.538 (5%) and 0.667 (1%)) for the F.4-F.6 group and quite high (0.731 (5%) and 0.839 (1%)) for the adult groups.

The special problem involved in the Malaysia study (See Section 7.1) prevents a proper cross-cultural studies including the Malaysians.

Generally speaking, it is concluded that the above hypotheses (1 to 4) are cultural universal with respect to the English and Chinese samples used here. It is emphasized that this conclusion does not necessarily imply that there is no cultural difference in other aspects of moral development measured by the MDT or other tests.

H.6 (Convergent Validity)

The original hypothesis has a restricted scope of validity; it deals with only the convergent validity of the MDT. The discussion of other validity studies performed here will be given in the next section.

It should be noted that:

(i) The validity study has been carried out with the London sample only (See Section 6.2.8). Apart from the MDT and DIT, all other tests were answered by F.2 to F.4 subjects only.

(ii) The response rate of the tests used in the validity study was usually lower than that of the MDT (See Table 5.14). In addition, the samples used were usually much smaller in comparison with the MDT samples. This implies a greater problem of sample bias in the validity study.

(iii) subjects were less co-operative in answering tests of intellectual abilities such as RPM and SRT (See Section 5.5) than in answering the MDT.

TABLE 7.3

A Summary of the Correlations and Partial Correlations (Controlling for the age effect) Between the MDT and MJI/DIT.

	Number of Subjects	NRO3		NRJO3		NRRJO3	
		Γ	Γ_p	Γ	Γ_p	Γ	Γ_p
MMS	(a) 43	-0.2585 *	-0.1692	na	na	na	na
	(b) 29	-0.3754 *	-0.3798 *	-0.3895 *	0.3981 *	-0.4302 **	-0.4367 **
DITP	86	-0.3032 **	-0.0512	-0.3103 **	-0.1736	-0.3463 ***	-0.1082
DITD	86	-0.4376 ***	-0.2006 *	-0.4694 ***	-0.3882 ***	-0.5079 ***	-0.3074 **
DRJO3	117	0.3206 ***	0.1969 *	0.3165 ***	0.2229 **	0.3572 ***	0.2360 **

Notes:

(1) The "Number of Subjects" refers to the N used in the computation of correlation coefficients (Γ). The N for computing the Partial Correlation (Γ_p) may be two or three cases less because of the missing data on the variable age.

(2) $*p \leqslant 0.05$ $**p \leqslant 0.01$ $***p \leqslant 0.001$

(3) Source: MDT with MMS is from T 6.17 and A 6.2(I); MDT with DIT from T 6.18 and A 6.2(J). (T = Table, A = Appendix).

Statistically speaking, there are two different categories of test indices used here:

(i) The MDT rating indices (i.e. CT, N, J, NR, RJ, WRRJ etc.) and DRJ03 which are constructed such that a small value measures a high stage of development and vice versa.

(ii) The MDT Part II ranking indices (e.g. RANKP, RANKR); & MMS, DITP, DITD, RPM, SRT and TT which are constructed such that a large value measures a high stage of development or high level of performance and vice versa. A High Score on the JEPI index implies a strong personality characteristic relevant to that index.

On the other hand, TRC and SN indices of the MDT do not in general measure the stage of development directly, instead, they measure the consistency of one's responses in accordance with the N(R) hierarchy.

It follows that a positive relation between any pair of test indices is indicated by (a) a positive correlation if the two indices concerned are in the same catagory or (b) a negative correlation if the two indices are in different categories.

With the above interpretation of the test indices in mind, the findings in Table 7.3 support that there is convergent validity for the MDT using the MMS and DIT indices as validating criteria. All the partial correlations are smaller than their corresponding Pearson

correlations, except in the MMS group (b). One reason for the almost equal values of the Partial correlations and their corresponding Pearson correlations in the MMS group (b) may be due to the small age range of this sample group which consists of F.3 and F.4 subjects (the average ages of these two groups are approximately 14.2 and 15.2 respectively). Further research using a larger sample of wider age range and broader social background is required to explore more refined relationships between the MDT and MJI.

Consider the DIT case: Correlations between the MDT and DIT indices are usually highly significant and are in the -0.30s for the DITP, -0.40s for the DITD and 0.30s for the DRJ03. Partial correlations controlling for the age effect are smaller: roughly speaking, in the -0.10s (non-significant at 5% level for the DITP, -0.20s to -0.30s (significant at 5% level) for the DITD and 0.20s (significant at 5% level) for the DRJ03.

It should also be noted that the correlations between NR03 and DIT scores are nearly equal to that between the RJ03 and DIT scores. This in general does not support the suggestion in Section 5.1(II) that MDT Part II scores should bear a stronger positive relation with MMS or DIT scores than the MDT Part I scores. On the other hand, it is generally true that the correlations between MDT and MMS/DIT are usually smaller than that between the MDT Parts I and II, which are usually in the 0.40s.

It is thus concluded that there are significant positive relations between MDT and MJI or DIT. However, the relations between MDT and MJI/DIT are only moderate or small after controlling for the age effect. In other words, the MDT does not in general generate scores which can be regarded as equivalent to the MMS or DIT scores. In short the hypothesis H.6 is claimed to be empirically supported.

7.4. Other Empirical Findings

I. Further Validity Studies

(1) The relationships between MDT and SRT, RPM & TT.

As mentioned above, the results of this particular validity study are regarded as less representative and less reliable from an experimental point of view.

(a) MDT and SRT (Science Reasoning Task)

According to Table 6.17, the correlation (NRO3, SRT) is 0.2063 ($p = 0.057$). The corresponding partial correlation, controlling for the age effect is 0.2386 ($p = 0.034$) (See also Appendix 6.2(I)). On the other hand, if only F.3 and F.4 subjects are used, the correlations (NRO3, SRT), (RJO3, SRT) and (NRRJO3, SRT) are 0.0478, 0.0997 and 0.0774 respectively ($p < 0.300$ in all cases) (See Appendix 6.2(I).

The findings reveal a negative relation between NRO3 and SRT which is opposite to what is expected and is, at present, inexplicable. The relations between (i) RJO3 and SRT, and (ii) NRRJO3 and SRT are not also clear in this case.

(b) MDT and RPM (Raven's Standard Progressive Matrices)

From Table 6.17, the correlation (NRO3, RPM) is -0.1578 ($p = 0.123$) and from Appendix 6.2(I), the correlations (NRO3, RPM), (RJO3, RPM) and (NRRJO3, RPM) are -0.3116, 0.1895 and -0.2194 respectively ($p < 0.09$ in all cases).

Since all the correlations are non-significant at 5% level, the values are less acceptable and statiscally less meaningful. Nevertheless, as far as the values of the correlations are concerned, all of them except the (RJO3, RPM) indicate a non-significant positive relation between the MDT and RPM.

(c) MDT and TT (Bergling's Thinking Test)

From Table 6.17, the correlation (NRO3, TT) is -0.1169 ($p = 0.285$) and from Appendix 6.2(I), the correlations (NRO3, TT), (RJO3, TT) and (NRRJO3,TT) are in the range of 0.15 to 0.25 ($p < 0.15$ in all cases). As far as the values of the correlations are concerned, all correlations except the (NRO3, TT) in Table 6.17 show a non-significant negative relation between the MDT and TT.

Generally speaking, the correlations between the MDT and tests of intellectual ability are obscure, fluctuating and less consistent among themselves. This may probably be due to the empirical problems mentioned above or the sample characteristics. Alternatively, the findings may hint that the relation between the MDT (Part I in particular) and intellectual ability tests is weak - probably much weaker than that between the MMS (or DIT) and intellectual ability test scores. This problem is left open for further research. Thus there is no definite conclusion on the relation between the MDT and intellectual ability tests at the present stage.

(2) MDT and JEPI

TABLE 7.4

A Summary of the Pearson Correlations Between the MDT and JEPI Scores.

	(a) From T6.17 N=143	(b) From APPENDIX 6.2(I) N=75		
	NRO3	NRO3	RJO3	NRRJO3
JEPIE	0.1314	0.1654	0.3532 ***	0.2548 *
JEPIN	0.0679	0.1516	0.1532	0.1772
JEPIL	-0.2023 **	-0.2321 *	-0.1249	-0.2351 *

Notes:

(1) Sample (a) consists of F.2 to F.4 subjects while sample (b) consists of F.3 and F.4 subjects only.

(2) +$p \leq 0.05$ **$p \leq 0.01$ ***$p \leq 0.001$

(3) T6.17 = TABLE 6.17.

According to Table 7.4, there is a significant positive correlation between RJO3 (or NRRJO3) and JEPIE, which indicates a strong negative relation between the relevant MDT indices and JEPIE. Judging the less significant and smaller correlation between NRO3 and JEPIE, it is likely that the positive correlation between NRRJO3 and JEPIE is accounted for more by RJO3 than by NRO3. In some sense, the above finding reveals that extrovert children are usually at a lower stage of development as measured by the RJO3 or NRRJO3 indices than the introvert children. There appears to be no significant correlations between the MDT and JEPIN indices. On the other hand, the NRO3 and NRRJO3 correlate negatively and significantly with the JEPIL, which indicates a positive relation between them. It implies that children at a higher stage of NRO3 (and NRRJO3) tend to get higher score in the JEPIL index. This finding requires further heuristic discussion.

In some sense, high JEPIL score means less 'honest' or a stronger tendency to 'lie'. In other words, the finding suggests that subjects at higher stage of NRO3 (or NRRJO3) are less 'honest' than those at lower stage. Though this finding is not sufficient to allow one to jump to the conclusion that the high stage subjects have a stronger tendency to 'fake good' in answering the MDT items, it does throw some light on this issue. Further research employing more systematic and sophisticated experimental design are required to answer this question properly. (See also e.g. Rest, 1979b, p.214-229; Yussen, 1976 for

a discussion on similar issue).

(3) Further Study on the Relationship Between the MDT and DIT.

The similar test formats used in the MDT and DIT and the apparently similar nature of the MDT Part II and DIT justify a further study on their empirical relationships.

The following discussion is based on the results of the Principal Component Analysis of the 4N, 4J and 4DJ variables given in Table 6.19 and Appendix 6.2(J):

(1) Apart from the direction of the order, the factor loadings along the second factor of the 4J and 4DJ Factor Matrices arrange themselves in the order predicted (See also Section 7.3). Basically speaking, the plots of the VARIMAX rotated factors in both the Factor Analysis of the 4J and 4DJ variables are striking similar, except again the direction of the order.

(2) Factor Analysis of (4J + 4DJ) variables

The result shows that the first three factors have eigenvalues greater than one and they account for 63.3% of the variance. A three-factor Principal Component Analysis was performed. According to the VARIMAX rotated plots, the eight variables (4J + 4DJ) are situated either inside or very close to the first quadrant of each of the three plots. The order of the 4J and 4DJ variables along the three rotated factors

are as follows (variables appear in brackets are very close to each others along the factor studied):

(a) Factor 1 (read the First plot from left to right)

4J: J2 - (J3, J5) - J4

4DJ: (DJ2, DJ5, DJ3) - DJ4

(b) Factor 2 (read the first plot from top to bottom):

4J : (J3, J2) - (J5, J4)

4DJ : (DJ2, DJ3) - (DJ4, DJ5)

(c) Factor 3 (read the second plot from bottom to top):

4J : J2 - (J3, J4) - J5

4DJ : (DJ4, DJ2, DJ3) - DJ5 (the distance between DJ4 and DJ2 is longer than that between DJ2 and DJ3 on this plot)

It appears that the block features of the 4J and 4DJ variables expressed in these plots of rotated factors are fairly similar with some refined differences. The interpretation of these three factors is left open at this stage.

As far as the present study is concerned, the validity, mainly the construct validity, of the MDT has been demonstrated in the following aspects:

(i) high psychometric reliability

(ii) good face validity

(iii) an internally consistent construct expressed by the results of factor analysis and good internal consistency reliability

(iv) good convergent validity using the MMS and DIT scores as validating criteria

(v) fairly divergent validity using the JEPI scores as

validity criteria.

On the other hand, the scope of the above validity study is restricted. Further studies are required in order to justify a stronger claim of the construct validity of the MDT.

Two points also deserve discussion here:

(i) As mentioned before, the MDT rating indices are constructed in a way such that it measures a higher stage with a smaller value; while this does not cause any logical inconsistency by itself, it may be more convenient to construct the indices so that it measures a higher stage with a larger value.

(ii) The NRO3, RJO3, NRRJO3 and WNRRJO3 indices instead of the others have been used in the above discussion because they are constructed with larger weightings for the N36, N51 and J3, J5 indices which are thought to be less sensitive to change or more stable than the other N and J indices. The major results do not change at all if other coresponding indices (e.g. NRO1, RJO1 etc.) are used in the above discussion.

II. Sex Differences in the MDT Scores

It should be noted that the MDT has been constructed in a way such that there is, as far as possible, no sex bias in the content.

According to Table 6.15 (London Study), there are highly significant ($p < 0.01$) sex differences in the means of CTA, CTB, N16 and N36 and to a less extent ($p = 0.019$) in the means of N51. Similarly, the results in Hong Kong Study (See Appendix 6.5) also show that there are significant ($p < 0.05$) sex differences in the means of CTA, CTB and N16; and p is 0.065 for N36. The Hong Kong results basically do not change if the C5 sample (the one which consists of a F.4 class of girls from the School C5 (See Section 5.3)) is also included. In both the London and Hong Kong Studies, the means of CTA and N16 are greater in the female group than those in the male group,, while the reverse is true for the means of CTB and N36. A high score for N16 implies a less positive tendency for self-survival needs, which in some sense implies a more altruistic attitude towards others; the small score for N36 clearly indicates a stronger affection for others. In other words, females are found to be more altruistic and more affective than the males. These findings are consistent with those of Gilligan (1977, 1982).

On the other hand, there is no significant mean difference in the J, RJO3 and NRRJO3 indices in both London and Hong Kong Studies except (i) for J1 in London Study, in which the mean for the male group is significanlty larger than that of the female group (ii) for J4 in Hong Kong Study, in which the male group is significantly larger than that of the female group. If the C5 sample is included, the sex difference in the J4 scores becomes insignificant at 5% level ($p = 0.059$).

In general, it is concluded that there are some significant sex differences in the MDT scores. However, such differences do not change the general N(R) - J structures. It is suggested that the female N(R) - J sub-structure (with respect to the general structures which are hypothesized for almost all persons and all cultures) differ from the male ones only in the emphasis of certain aspects or contents but not in the hierarchical order or in the general structural aspects. For example, while females may rate affective needs (i.e. N36) as more important than the males, their measure on affective needs (N36) is still in general more important than their measure on esteem and social needs (i.e. N415). It should be emphasized that this particular and interesting finding is important for further research (See also Gilligan, 1977, 1982; Kohlberg, 1982, Flanagan, 1982).

7.5. The Potential of the MDT in Moral Research

There have been a number of claims and positive conclusions throughout the above discussion. All of them refer to the empirical findings of the present study only. It is far too early at this preliminary stage of the MDT research to claim that the above conclusions are general and final. More future studies are required to justify the above claims in a more elaborated, elegant and general manner.

One major defect of the MDT is its inability to distinguish true responses from 'faking' ones. In addition, the methodology of the MDT does not, by itself, ensure the eliciting of true responses from the subjects, instead, it relies on the co-operation of the subjects. (This is virtually true for all psychological tests). This is indeed a difficult research problem. First of all, not all the subjects are willing to co-operate. Secondly, while some of them may be willing to co-operate, they may not understand the test instructions properly. Thirdly, hypothetical situations are much simpler than real-life situations..... (See also Section 4.2). In short, the MDT is designed in such a way that subjects can easily 'fake good' or 'fake bad', if they wish to, particularly in some of the Part I item responses, e.g., the X_is of the item 'B'.

The major defect of the MDT reflects a fundamental problem in psychological study in particular; in science or any systematic study of knowledge in general. The problem is: how true or exact a theoretical or empirical study is in the explanation or description of reality. This problem appears to be more serious in social science than in natural science. While the MDT is effective in a number of aspects, its defect of being unable to give a true or exact picture of reality is part of its intrinsic nature as a psychological test, particularly as a test which employs hypothetical dilemmas. It is, of course,

always possible to improve the MDT in the future so that it may give a better picture of reality. On the other hand, it will be suggested in the next chapter that more explorations using other empirical methods (e.g. observation, interview and sociological studies) should be carried out in order to test the *TMD properly.

The major contribution of the MDT is perhaps on the preliminary establishment of a scientific foundation for studying empirically the fundamental nature of moral development.

8. Suggestions and Conclusions

On the whole, it has been concluded that the *TMD is empirically supported up to the fifth stage in the present empirical study. Nevertheless, the support is not entirely strong and satisfactory in all aspects for what could be called a fundamental theory of moral development. Judging from the limitations of the present study described in Sections 7.1 and 7.5, the findings cannot be generally accepted without further studies and replications.

In the following paragraphs, the direction of future study concerning the *TMD and MDT is suggested; some of the suggestions have been elaborated elsewhere in the thesis.

I. Theoretical Suggestions

(1) Refined Differentation of the N(R) Hierarchy

It is suggested that the 'N', 'R', N(R) and J hierarchies should be divided into more refined categories. It may be easier to start this task with the 'R' hierarchy first. (See also Section 4.3.1).

(2) A More Elegant Mathematical Approach

Mathematically speaking, if the number of divisions

of the hierarchies becomes infinitely large and if the method of such division obeys a certain set of mathematical criteria, then the integral calculus can be applied in the study of the N(R) and J structures. While this is certainly too speculative at the present stage, it suggests a goal for developing the theory.

(3) Fundamental Parameters of Moral Development

In the *TMD, three fundamental parameters, namely, Psychological Needs (N), Human Relationships (R) and Structure of Judgment (J), have been proposed in the explanation of the fundamental nature of moral development. Further studies should attempt to explore some other possible fundamental parameters.

In addition, while the N and R appear to be inseparable in some sense, they are not entirely the same and further work is needed to explore the relationship between N and R. Parameter J seems to be unique. However, the direct application of the Piaget & Kohlberg's system here may or may not be appropriate. It would be important to investigate more closely the relationship between the affective and rational judgment structures.

II. Empirical Suggestions

(1) As mentioned in Section 7.5, the major defect of the MDT is its intrinsic nature of being a psychological

test using hypothetical dilemmas. It is thus important to employ some other empirical methods to study the general features of the *TMD. It would be more desirable, from a theoretical and empirical point of view, if data could be collected from real dilemma situations where the researcher armed with a predesigned set of general questions acts as a participant observer or as a journalist. However, although similar studies in social psychology are fairly common, the ethical nature of this approach to moral research could be questioned. Many other common methods used in social science such as auto-biographical writing, observation, survey, interview, sociological and anthropological methods could well be used for investigating the *TMD.

(2) A few suggestions for future research on the MDT are as follows:

(a) the construction of an MDT for young children of age smaller than 12 years.

(b) an open-ended MDT; possibly with Part I as the present form and Part II as an open-ended form like Kohlberg's MJI.

(c) the inclusion of additional X_is. One major advantage of the MDT Part I is its flexibility in using a wide range of X_is.

(d) the extension of MDT Part I to include more variables. While the present MDT uses only one variable X_i in its Part I, it is always possible to use more

than one variable. For example:

Suppose you see X_i doing Y_j things, would you report X_i to the police if (X_i, Y_j) are _____?

X_1 = Your father/mother	Y_1 = murdering
X_2 = Your best friend	Y_2 = robbing
X_3 = a stranger	Y_3 = driving without a valid driving licence etc.
etc.	

(e) the effect of the order of Parts I and II on the responses.

(f) the first personal view against the third personal view, or other perspective of role taking.

Some other suggestions which have been discussed elsewhere are not included here.

III. Philosophical Suggestions.

(1) It is important to establish the Stage 7 (and also the Stage 6) in a more universal and broader scope because it probably tells us the direction of our ultimate development.

(2) The application of the *TMD in the explanation of Nature in general is perhaps one of the most beautiful objective of every researcher. After all, all the things in Nature may appear to be an integrated and harmonious whole.

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APPENDIX 1 (A)*

2. THEORIES OF MORAL DEVELOPMENT: I

2.1 Introduction

Generally speaking, there are three main approaches to the psychological study of morality: (1) Psychoanalytic theory, (2) Behaviouristic or learning theory, and (3) Cognitive Developmental Theory. It has been argued that,

> "psychoanalytic theory has emphasized the feeling aspect, learning theory the behavioural aspect and cognitive developmental theory, the cognitive aspect". (Graham, 1972, p. 17).

However, many empirical studies have been conducted which have not rested on a particular theoretical approach, for example, an early and well known empirical study of moral development was the extensive and complex research carried out by Hartshorne and May (1928, 1929, 1930). Different character traits of children, such as service tendencies, generosity, group loyalty and self-control, were intensively studied. The research findings showed that most of these character traits are specific and situation dependent.

> "We (Hartshorne, May & Miller) find that with children in grades 5 to 8 service tendencies are specific rather than general and are made more in response to the external demands of the situation than to inner views of the principles or ideals involved.... we find also that self-control, like the other types of conduct so far studied,is specific and is functionally related to the situations to which the responses are made."
>
> (Hartshore, May & Maller, 1929, p. 8-9).

They also found that these character traits

> "are learned just like any other skill". (p. 10)

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* This appendix is a reprint of the Chapter 2 and the relevant appendices of Ma, 1980. The Section number and Appendix number follow those of the original source.

This study resulted in a large number of experimental techniques and findings but it did not "seek the structures of morality within the developmental growth processes of the children". (O'Byrne, 1976, p.20).

Nevertheless, Burton (1976) in a review of empirical studies of honesty supports most of Hartshorne & May's findings.

2.2 Psychoanalytic, Behaviouristic and Other Theories of Moral Development

In the first part of this chapter, a number of theories will be described briefly and will be followed by a critical discussion.

2.2.1 Psychoanalytic Theory

Psychoanalytic Theory established by Freud is regarded by many psychologists (Aronfreed, 1976, p. 54; Gilligan, 1976, p. 144) to be the first psychological theory of moral development.

Freud's psycho-sexual theory of personality development is based on three hypothetical systems which are called: Id, Ego and Supergo. The id is exclusively unconcious and consists of all the primitive inherited impulses, including the instincts of sex and aggression, present at birth. The id is said to operate in terms of the pleasure principles or functions in terms of the primary process. That is, the id attempts to avoid pain, reduce tension and maximize pleasure or satisfaction irrationally. The ego and supergo develop from the id. The ego operates in terms of the reality principle in the sense that it attempts to take the real world into consideration in the process of the achievement of satisfaction. In other words, the ego tries to adapt to reality with the power of energy derived from the id. (Wright, 1971, p. 31-38; Graham, 1972, Chapter 2).

The supergo can be regarded as a sub-structure developed from the ego. It is composed of the conscience, which suppresses or neutralizes "those instinctual forces which if acted upon, would violate the moral rules of society." (Wright, 1971, p. 34), and the ego-ideal, which is "to hold before the ego those positive ideals of behaviour that society judges worthy of cultivating". (Wright, 1971, p. 34). The formation of the conscience is through the identification with the aggressor. On the other hand, the mechanism governing the development of the ego-ideal is the anaclitic identification, which is motivated by the libidinal attachment or love.

The explanation of the development of morality and personality by instincts is largely modified by many of Freud's followers such as Jung, Alder, Fromm, Horney and Sullivan, who are often called neo-Frendians. The neo-Frendians "saw personality as shaped much more by the people, society, and culture surrounding the individual than by instincts". (Hilgard, Atkinson & Atkinson, 1979, p. 392).

On the other hand, Erikson lays special emphasis on the study of the ego, as a social construct, "a concept denoting man's capacity to unify his experience and his action in an adaptive manner". (Erikson, 1963, p. 13). He proposes a series of eight psychosocial stages to characterize the development of ego from birth through adulthood to old age. (Erikson, 1963, Chapter 7) (see also Appendix A6). At each stage, there are certain special "crises" to be confronted. Successful resolution of these "crises" at any stage enables the child to proceed to the next stage in a stable and healthy way.

> "Inadequate resolution at any stage prejudices the child's ability to cope successfully with the next stage, and consequently the child's whole development, including his moral development".
>
> (Graham, 1972, p. 57).

Recently, Gilligan (1976) has attempted to integrate the concepts of shame and guilt into a psychoanalytic theory of moral development.

2.2.2 Behaviouristic Theory

Early Behaviouristic theory was promulgated by J.B.Watson and has its roots in the work of I.P.Pavlov. It was later extended by Hull and Skinner and has become another very influential approach in the study of moral behaviour. The behaviouristic, or learning theorists, argue that moral behaviour like other behaviour, is learned or acquired through the same kind of process which follows the paradigms of classical and operant conditioning. For example, the child's moral behaviour will be shaped by its parents through the reinforcement of responses that meet his parents' specifications and the extinction of all the others. Eysenck (1976) argues that "it is pointless to ask why people behave in a selfish, aggressive, immoral manner; such behaviour is clearly reinforcing in that it gives the person or organism acting in such a fashion immediate satisfaction." (p.108). The basic sources of satisfaction lie in the physical or biological needs of man. Other sources of satisfaction are derived from these needs by association. (Graham, 1972, p.17).

The main emphasis of the Behaviouristic theory is on the studies of the effective control of human behaviour. (Skinner,

1953, chap.2). Skinner "confines himself largely to indicating ways in which one can increase the probability of individuals behaving according to the requirements of any given socio-ethical system." (Graham, 1972, p.97)

Some psychologists accept the basic assumptions and concepts of Behaviouristic Theory as important but insufficient to explain the development of moral behaviour. They attempt to include factors like cognitive functioning and social learning and are referred to as neo-behaviourists. Some of the neo-behaviouristic theories are: Mowrer's (1960) Theory of Imitation or Modelling; Festinger's (1957) Theory of Cognitive Dissonance; Bandura & Walters' (1963) Theory of Social Learning; Dollard & Miller's (1941) Theory of Reinforcement; and Mischel & Mischel's (1976) Cognitive Social Learning Theory. Recently, Aronfreed (1976) has attempted to construct a rather "eclectic" theory of moral development, based on his previous version of reinforcement theory. Out of these newer approaches, social learning theory has had a major impact on research into moral development.

2.2.3 Social Learning Theory

Bandura and his associates criticise extreme behaviourism in two main ways. First of all, they argue that the theory of reinforcement is good to explain how behaviour which has been acquired or learned is maintained by the pattern of reinforcement, but it is insufficient "to explain how new behaviour may be learned in the first place". (Graham, 1972, p.109). Secondly, Bandura criticises strongly that it is not a proper

approach to neglect "determinants of behaviour arising from cognitive functioning." (Bandura, 1977, p.10). He argues: "with growing evidence that cognition has causal influence on behaviour, the arguments against the influence of internal determinants began to lose their force." (p.109). In order to account for the constitutional factors and social learning influences, Bandura develops a theory called "Social Learning Theory", which attempts to "explain the development of all forms of social behaviour in terms of antecedent social stimulus events....., the reinforcement contingencies of his (an individual's) learning history, and the methods of training that have been used to develop and modify his social behaviour". (Bandura & Walters, 1963, p.44)

Social learning theory lays special emphasis on the roles played by "vicarious, symbolic, and self-regulatory processes in psychological functioning." (Bandura, 1977, p.vii). The basic idea of vicarious or observational learning is that children observe parents' behaviour, imitate it, and if it is rewarded it is more likely to recur. Generalisation of a particular behaviour is also possible through a reinforcement and association. In addition, if the behaviour of the model can be verbally coded or symbolically represented, observational learning is likely to be more effective.(Graham, 1972, p.112-113)

One important recent development in the theoretical perspective of social learning theory is that human behaviour is

explained in terms of "a continuous reciprocal interaction of personal and environmental determinants" (Bandura, 1977, p.11) This concept of reciprocal interaction implies that human functioning "neither casts people into the role of powerless objects controlled by environmental forces nor free agents who can become whatever they choose." (Bandura, 1977, p.vii)

Recently, Mischel and Mischel (1976) have also attempted to construct a cognitive social-learning theory which can be applied to the analysis of moral judgments, prosocial conduct and self-regulation.

2.2.4 Explanations of Empathy and Altruism*

The psychoanalytic theorists attempt to explain altruistic behaviour in terms of attachment. Assuming "all other things are being equal", altruistic tendencies towards close relatives and friends are much larger than that towards strangers. Psychoanalysts explain this rather obvious fact in terms of their notions of ego- or self-extension, projection and identification. "It is through our relationships to others, our social embededness, that we define ourselves". (Wright, 1971, p.130). However, such explanation is not regarded as satisfactory. On the other hand, behaviourists argue that altruism is a habit or a product of social conformity, which is learned by conditioning processes with rewards as reinforcement. Social Learning Theorists (Aronfreed, 1968,1969; Rosenhan, 1969, Rosenhan & London, 1968) explain altruistic acts in terms of modelling, positive experience and observational learning. One main defect of these theories is the relative neglect of the

*A more elaborated discussion of Hoffman's theory is given in Section 2.2 of the text.

cognitive aspect of empathy and altruism. For many years, Hoffman (1976) has been attempting to formulate a theory of empathy and altruism which takes into account the affective, reinforcing and cognitive aspects in one setting.

The basic assumption of Hoffman's theory is that "man is innately capable of both altruistic and egoistic motivation." (Hoffman, 1976, p.124) According to Hoffman, the development of altruistic motivation is based on the development of a cognitive sense of the other, which consists of three stages: "(a) the sense of the other as a physical object; (b) the sense of the other as possessing inner states independent of the observer's; and (c) the sense of the other as having his own continuous identity as a person extending beyond the immediate situation." (Hoffman, 1975, p.143) The initial stage of the development of altruistic motivation is the emphatic distress, which refers to the primitive, self-orientated, "involuntary, at times forceful experiencing of another person's emotional state." (Hoffman, 1976, p.126) With a development of a sense of the other, the child develops a true sympathetic concern for the other with "a growing awareness of the similarity between his own and the other's independent affective response to situations." (Hoffman, 1976, p.136) Hoffman (1976) also uses the concept of guilt to account for the feeling of a person when he "sees himself as the cause of the other's distress." (p.139)

In short, M.L.Hoffman has taken a giant stride in developing a theory which integrates the cognitive and affective aspects

of altruistic behaviour.

2.2.5 Typological Theory of Moral Judgment & Socialization

Garbarino and Bronfenbrenner (1976) established a 3-stage theory of moral development and socialization, based on Bronfenbrenner's nonhierarchical typology of moral judgment and behaviour. (Bronfenbrenner, 1962; see also Appendix A1). This theory can be called the typological theory of moral judgment and socialization.

The three developmental stages or levels described by this theory are as follows (see also Appendix A6):

Level I: This is the amoral or pre-moral stage. All the behaviour is oriented towards self-satisfaction only and the individual is regarded as "unsocialized". In general, it occurs in very early childhood. "This level roughly corresponds to Kohlberg's premoral stage 0 and to Bronfenbrenner's self oriented-type." (Garbarino & Bronfenbrenner, 1976, p. 72).

Level II: The individual's moral judgment and behaviour is directed by authorities, social norms and laws. This level corresponds to Kohlberg's stages 1 to 4 and Bronfenbrenner's authority-oriented type, peer-oriented type and collective-oriented type.

Level III: "At this level, values, principles, and ideas rather than social agents are the directing forces". (p. 72) In other words, the individual's behaviour is directed by his self-chosen moral principles, which are not necessarily in conformity with social conscience and laws. This level corresponds to Kohlberg's stage 5 and 6, and Bronfenbrenner's

objective oriented type.

Garbarino & Bronfenbrenner (1976) argue that the above three developmental levels are "the same for all persons and cultures". (p. 72). In addition, the level III is described as pluralistic, in contrast to monolithic and anomic. A pluralistic setting is one in which "social agents and entities represent somewhat different expectations, sanctions, and rewards for members of the society". (p. 75) According to their empirical findings, people in a pluralistic society develop much more mature moral judgment than those in monolithic or anomic societies. They also found that, "the greater the sociopolitical pluralism, the less authority-oriented the children, or conversely, the greater the moral pluralism". (p.82)

2.2.6 A Holistic Theory of Moral Development

Simpson (1976) develops a holistic theory which attempts to account for the cognitive, affective and conative aspects of moral development in one setting. She argues that there are three requisites to moral progress: (a) the role-taking opportunities described by Kohlberg, which refers to "opportunities to participate in what is socially new and cognitively challenging to the individual". (Simpson, 1976, p. 163). (b) the satisfaction of basic psychological needs, and (c) the cultivation of imagination. According to her theory, there is an one-to-one correspondence between the motivational aspects of moral development posited by Kohlberg and the Hierarchy of Needs by Maslow (1970). (See also Appendix A2). Simpson argues that "individuals who remain

motivated by unfulfilled psychological needs may not be able to function at higher levels of moral development, regardless of their stage of cognitive development". (Simpson, 1976, p. 160). In other words, if an individual is motivated by his basic psychological needs, no principled moralization can occur. This further implies that morality is basically irrational. In addition, she lays great emphasis on the role of imagination in moral development. She regards imagination, the creation of reality, "as ethicogenic in the sense that it helps to form both the conceptual and the behavioural boundaries of the moral universe." (p. 165) In short, the Holistic theorists argue that the whole personality development, the whole personological structure and the whole person is the basis of morality. The cognitive development alone is not good enough to account for the moral development.

2.2.7 Social Perspective Taking Theory

G H Mead, the founder of the Symbolic Interactionism, coined the term "role taking" (Mead, 1934, p. 254)and emphasized the importance of taking the role of the other in social interaction. Initiated by Mead's argument, Selman (1971a 1975, 1976) attempts to formulate a developmental theory of Social Perspective Taking. According to his theory, there are five stages (stage 0: Egocentric Viewpoint to stage 4: Social and Conventional System role taking) of social perspective taking. (Selman, 1976, p. 309; see also Appendix:A3). Each stage or level of social perspective taking "describes the way in which a child at that level understands the relations between the perspective of self and other". (Selman, 1975, p. 58). The ability of the child to understand the different kinds of social perspectiveal

relations rather than the content is emphasized.

Selman (1971b) reported in an empirical study that there was a significant positive correlation between the role-taking levels and chronological age, implying that the child develops his social perspective taking through a sequence of ordered stages. In another empirical study (Selman, 1971a), Selman found that the development of Social Perspective Taking is a necessary but not sufficient condition for the development of conventional moral reasoning. In other words, it is possible for one to be in a very high stage of social perspective taking and yet in a quite low level of moral reasoning. Another important implication of the theory is that the "perspective taking is a 'neutral' social cognitive capacity and that higher levels of perspective taking can be applied to explain social behaviours such as communication skills, interpersonal relations and sociomoral judgment. (Selman, 1975, p. 59). In addition, the implications of the theory for social and effective education, and clinical diagnosis are under researches (Selman, 1976, p. 308-316). It is obvious that this theory is in close relation with the cognitive developmental theory which is discussed in the next chapter.

2.3 A Critical Discussion

2.3.1 Psychoanalytic Theory

Psychoanalytic theory has been criticized as being too loosely formulated. Many of the ideas are ambiguous and the theoretical construction is not systematic and elegantly logical. For example, "it is not altogether clear how the various kinds of identification of which Freud makes use are related to one another." (Graham, 1972,

p. 19). The concepts of instincts and the inner emotional life have never been defined clearly or operationally. Hence many of the implications or deductions of the Psychoanalytic Theory can never be tested empirically. Aronfreed (1976, p. 55) writes:

> "It is particularly difficult to find meeting points between psychoanalytic theory and more contemporary knowledge of the processes of learning and development in children."

Wright (1971, p. 37) also argues that:

> "as far as empirical psychology is concerned it (the psychoanalytic theory) is now mainly of historical interest."

One important implication of the psychoanalytic theory is that the early experience of the child determines, to a very large extent, his/her later development. For example, "the theory suggests that the strength of individual's conscience is largely settled by the age of about five years." (Wright, 1971, p. 38). This has been heavily criticized. Clarke and Clarke (1976, p. 272) in their extensive review of the current empirical studies on child development conclude:

> "the whole of development is important, not merely the early years. There is as yet no indication that a given stage is clearly more formative than others; in the long term all may be important."

Despite the above criticism, the psychoanalytic theory is still one of the major psychological theories in the studies of the emotional and affective aspect of moral development.

2.3.2 Behaviouristic Theory

Behaviouristic theory is clear, systematically coherent and logically consistent. Generally speaking, it can be regarded as a scientific theory of human behaviour in the sense that it can be tested empirically. (Graham, 1972, p. 19-20).

On the other hand, cognitive psychologists argue that moral

behaviour cannot be satisfactorily explained by such a simple theory of conditioning. For example, behaviour motivated by a need of self-acutalization or rationally backed up by the Universal Ethical Principle described by Kohlberg as stage 6 moral thinking, cannot be satisfactorily accounted for in terms of stimulus-response association. In addition, the argument that "conscience is a condtioned reflex" (Eysenck, 1976, p. 109) is problematic because "to identify morality with conformity is to be forced to take the position that a loyal Nazi was behaving morally." (Lickona, 1976, p. 3).

2.3.3. Social Learning Theory, Theories of Empathy & Altruism Typological Theory, Holistic Theory and Social Perspective Taking Theory

We would classify psychological theories in two ways: (a) Structural Approach and Aspect Approach (b) First-order theory and Second-order theory. The structural approach emphasizes the establishment of a well-organized structure of concepts to account for "every aspect" of human behaviour, while the aspect approach attempts to focus on one or a few aspects only. First-order theory tries to explain human behaviour in terms of some most fundamental parameters and basic psychological functioning. They are not built up on other theoretical foundations in psychology. On the other hand, second-order theory is constructed, to some extent, on the assumptions and basic conceptual foundations of the first-order theories. They are original but not quite fundamental in nature.

Rougly speaking, the theories of moral development can be classified as follows:

(a) First-order and Structural: Psychoanalytic theory & Behaviouristic theory.

(b) Second-order & Structural: Social learning theory (including Cognitive Social Learning Theory) and the Holistic theory.

(c) First-order and Aspect: Cognitive Developmental Theory.

(d) Second-order and Aspect: Theories of Empathy & Altruism, Typological Theory, & Social Perspective Taking Theory.

There are some common features among the second-order theories of moral development: (i) All of them are newly developed in the past three decades. The Holistic theory is the newest. (ii) They are not supported by extensive empirical studies. (iii) Most of the theoretical arguments have only been tentatively explored. Since the theoretical arguments of these second-order theories are refined and improved from time to time, and we are short of space, we would shift our attention to the discussion of the most popular theory of moral development: Cognitive Developmental Theory.

APPENDICES FOR CHAPTER 2 OF MA (1980)*

A1. BRONFENBRENNER'S FIVE TYPES OF MORAL JUDGMENT AND BEHAVIOR

1. SELF-ORIENTED: in which the individual is motivated primarily by impulses of self-gratification without regard for the desires or expectations of others, except as objects of manipulation;
2. AUTHORITY-ORIENTED: in which the individual accepts parental strictures and values as immutable and generalizes this orientation to include moral standards imposed by other adults and authority figures;
3. PEER-ORIENTED: in which the individual is an adaptive conformist who goes along with the peer group -- which is largely autonomous of adult authority and ultimately of all social authority -- and in which behavior is guided by momentary shifts in group opinion and interest;
4. COLLECTIVE-ORIENTED: in which the individual is committed to a set of enduring group goals which take precedence over individual desires, obligations, and interpersonal relationships;
5. OBJECTIVELY ORIENTED: in which the individual's values are functionally autonomous -- that is, having arisen through social interaction but are no longer dependent, on a day-to-day basis, upon social agents for their meaning and application -- and in which the individual responds to situations on the basis of principles rather than on the basis of orientations toward social agents.

(Source: Garbarino and Bronfenbrenner, 1976, p.71)

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* Only Appendices A.1, A.2, A.3 and A.6 of the original source are included here.

A. 2 PARALLELS BETWEEN MOTIVATIONAL ASPECTS OF KOHLBERG'S AND MASLOW'S THEORIES

KOHLBERG: Stages of Motives for Moral Action	MASLOW: Hierarchy of Needs
1. Fear of punishment by another	1. Physiological needs
2. Desire to manipulate goods and obtain rewards from another	2. Security needs
3. Anticipation of approval or disapproval by others	3. Belongingness or affiliation needs
4. Anticipation of censure by legitimate authorities, followed by guilt feelings	4. Need for esteem from others
5. Concern about respect of equals and of the community	5. Need for self-esteem from sense of competence
6. Concern about self-condemnation	6. Need for self-actualization

(Source: Simpson, 1976, p.161)

A.3 SELMAN'S STAGES OF SOCIAL ROLE-TAKING

STAGE 0 -- Egocentric Viewpoint (Age Range 3-6)*
Child has a sense of differentiation of self and other but fails to distinguish between the social perspective (thoughts, feelings) of other and self. Child can label other's overt feelings but does not see the cause and effect relation of reasons to social actions.

STAGE 1 -- Social-Informational Role Taking (Age Renge 6-8)
Child is aware that other has a social perspective based on other's own resoning, which may or may not be similar to child's. However, child tends to focus on one perspective rather than coordinating viewpoints.

STAGE 2 -- Self-Reflective Role Taking (Age Range 8-10)
Child is conscious that each individual is aware of the other's perspective and that this awareness influences self and other's view of each other. Putting self in other's place is a way of judging his intentions, purposes, and actions. Child can form a coordinated chain of perspectives, but cannot yet abstract from this process to the level of simultaneous mutuality.

STAGE 3 -- Mutual Role Taking (Age Range 10-12)
Child realizes that both self and other can view each other mutually and simultaneously as subjects. Child can step outside the twoperson dyad and view the interaction from a third-person perspective.

STAGE 4 -- Social and Coventional System Role-Taking (Age Range 12-15)
Person realizes mutual perspective taking does not always lead to complete understanding. Social conventions are seen as necessary because they are understood by all members of the group (the generalized other) regardless of their position, role, or experience.

* Age ranges for all stages represent only an average approximation based on our(Selman and his associates') studies to date.

(Source: Selman, 1976, p.309)

A.6. Theories of Moral & Social Development

AGE	Moral Judgment (Piaget, 1932)	Moral Judgment (Kohlberg, 1958, 1976)	Moral Development and socialization (Garbarino & Bronfenbrenner, 1976)	Social Role-Taking (Selman, 1976)	Ego Development (Erikson, 1963)
Infancy & early Childhood	Premoral Stage	0. Premoral	1. Amoral; self-oriented	0. Egocentric viewpoint	1. Turst vs Mistrust 2. Autonomy vs Doubt 3. Initiative vs Guilt
Middle Childhood	Heteronomous Stage	1. Heteronomous Morality	2. Authority orientation, peer orientation, and collective orientation: Patterns of morality having as their dominant characteristic allegiance and orientation to some system of social agents	1. Social-Informational Role-Taking	4. Industry vs Inferiority
Adolescence and Adulthood	Autonomous Stage	2. Individualism Instrumental Purpose, and Exchange		2. Self-Reflective Role Taking	5. Identity vs confusion
		3. Mutual Interpersonal Expectations, Relationships & Interpersonal Conformity		3. Mutual Role Taking	
		4. Social System & Conscience		4. Social & Conventional System Role-Taking	6. Intimacy vs Isolation
		5. Social Contract or Utility & Individual rights	3. Objective orientation: values, principles and ideas rather than social agents are the directing forces.		7. Generality vs self-absorption
		6. Universal Ethical Principle			8. Integrity vs despair

APPENDIX 1(B)

I. Bull's Moral Judgment Theory

According to Bull (1969), there are four stages of moral judgment:

1. Anomy: Premorality

The first stage of moral judment "is characterised by purely instinctive behaviour. The only influences that modify it in any way are the pain and pleasure that are experienced." (p.29)

2. Heteromy: External Morality

In the stage of Heteromy, the child's moral judgment is dominated by the rules imposed by others, particularly the authorities.

3. Socionomy: Internal Morality

As the child grows up, he attempts to internalise the external morality as part of himself. He is no longer "wholly controlled by the crude, external sanctions of reward and punishment. The controls, now,are increasingly social praise and social blame - in a word, the voice of public opinion."(p.32)

4. Autonomy: Internal Morality

In the highest stage,the individual acts according to his self-chosen moral principle or inner ideals of conduct. He is no longer dependent upon the authority-oriented rules or public opinion. "His sanctions are his own, inner self-praise and self-blame."(p.34)

It is argued that the above four stages form a sequence which, "none can be by-passed if there is to be moral progress."(p.35). On the other hand, the four stages are closely linked with each other, that is,they are frequently overlap. In addition, the four stages "are linked, too, in their emotional overtones."(p.36)

In order to provide empirical evidence to his theory, Bull (1969) performed an experimental project to study the relationships between moral judgment and a set of variables which includes intelligence, socio-economic class, religious class and sex. The age variable also forms a major part of the study. Though a number of interesting results have been found, Bull's empirical work does not form a systematic and structural study of his theory, for example, psychometric properties such as reliability and validity of the tests used are not explored. Nevertheless, Bull's theory is a significant contribution to moral research.

II. Socioanalytic Theory

The Socioanalytic Theory proposed by Hogan, Johnson and Emler (1978) attempts to explain moral development from a broad social and cultural perspective. Four assumptions are postulated: (1) Moral development is assumed to have an evolutionary basis. (2) Communalism is emphasized. It is argued that there is a deep compatibility between a child's natural tendencies and the demands of adult society. Thus, "not only is conformity to culture normal, but the internalization of culture is essential to the normal development of personality." (p.6) (3) Three types of human needs are hypothesized: (a) need for social attention and approval, (b) need for structure, predictability and order, and (c) need for aggressive self-expression. (4) A set of cultural-anthropological assumptions regarding the role of moral socialization in the development of personality and the evolution of culture is made.

Based on the above assumptions, moral development is explained in terms of three central concepts: (1) Rule attunement, (2) Social sensitivity and (3) Autonomy. It is argued that these three central concepts "have been operationally defined in terms of objective personality scales for socialization (rule attunement), empathy (social sensitivity), and autonomy (self-awareness). These measures are scorable from the California Psychological Inventory (CPI) (Gough, 1975) ...." (p.12)

The theory has been proposed recently; more researches, particularly empirical ones are required to justify their claims.

III. Dialectic Theory

The Dialectic Theory (Baumrind, 1978; Meacham, 1975) has its roots in K. Marx's Dialectical Materialism which "seeks to understand the world in order to change it and thereby to realize man's destiny in it." (Baumrind, 1978, p.62) In short, "Dialectics is the study of the essential contradictions within all existence" (p.62)

The Dialectic Theory emphasizes that (1) Both the influence of the society and family on an individual's moral development and the effect of "the individual's actions for changes in the society"

(Meacham, 1975,p.167) are important, and (2) both the prosocial and anti-social behaviours should be considered in any theory of moral development.

According to Baumrind (1978), the Dialectical Materialists disagree with the Cognitive Developmental Theorists on a number of issues. Two of them are cited here: "(1) that there are universal moral principles against which all moral codes may be evaluated (usually with a dominant principle,such as distributive justice,defining the moral domain); (2) that by applying universal ontogenic stage notions to all individuals and cultures, some may be classified as absolutely more advanced than others" (p.63).

One major empirical study validating the Dialectic Theory is Baumrind's (1978) Social Cognition Interview (SCI) which uses a methodology similar to Kohlberg's MJI. A particular feature of the SCI is its emphasis on the identification of the 'should-would'discrepancies in the following aspects: (1) "What "one (impersonal-universal) should do and what a particular "one" (impersonal-particular) should do" (2) "What either "one" (impersonal-universal) or "s/he" (impersonal-particular) should do and what "I" (personal-particular) should do" (3) "What I "should " do and what I "would" do". (Baumrind, 1978, p.78). Though no empirical findings was reported by Baumrind, the theory certainly deserves further attention.

IV. Loevinger's Stages of Ego Development

Loevinger's (1966,1976) Ego Development Theory has its roots in Psychoanalytic Theory. It attempts to explain human development from a wide and fairly holistic perspective. Loevinger (1976) argues that "what changes during the course of ego development is a complexly interwoven fabric of impulse control,character,interpersonal relations, conscious preoccupations, and cognitive complexity, among other things." (p.26) A test instrument called "Sentence Completion Test" (Loevinger,1966; Loevinger et.al.,1970) was constructed to validate the theory. The empirical results are positive and promising. For further details, see Loevinger (1976). A comparison of Loevinger' Ego Development Theory with Kohlberg's Moral Judgment Theory can also be found in Kohlberg(1980).

A table summarizing Loevinger's Stages of Ego Development is reproduced on the next page.

Table A.1.1: Some Milestones of Ego Development*

Stage	*Code*	*Impulse Control, Character Development*	*Interpersonal Style*	*Conscious Preoccupations*	*Cognitive Style*
Presocial			Autistic		
Symbiotic	I-1		Symbiotic	Self vs. non-self	
Impulsive	I-2	Impulsive, fear of retaliation	Receiving, dependent, exploitative	Bodily feelings, especially sexual and aggressive	Stereotyping, conceptual confusion
Self-Protective	Δ	Fear of being caught, externalizing blame, opportunistic	Wary, manipulative, exploitative	Self protection, trouble, wishes, things, advantage, control	
Conformist	I-3	Conformity to external rules, shame, guilt for breaking rules	Belonging, superficial niceness	Appearance, social acceptability, banal feelings, behavior	Conceptual simplicity, stereotypes, cliches
Conscientious-Conformist	I-3/4	Differentiation of norms, goals	Aware of self in relation to group, helping	Adjustment, problems, reasons, opportunities (vague)	Multiplicity
Conscientious	I-4	Self evaluated standards, self-criticism, guilt for consequences, long-term goals and ideals	Intensive, responsible, mutual, concern for communication	Differentiated feelings, motives for behavior, self respect, achievements, traits, expression	Conceptual complexity, idea of patterning
Individualistic	I-4/5	*Add:* Respect for individuality	*Add:* Dependence as an emotional problem	*Add:* Development, social problems, differentiation of inner life from outer	*Add:* Distinction of process and outcome
Autonomous	I-5	*Add:* Coping with conflicting inner needs, toleration	*Add:* Respect for autonomy, interdependence	Vividly conveyed feelings, integration of physiological and psychological, psychological causation of behavior, role conception, self-fulfillment, self in social context	Increased conceptual complexity, complex patterns, toleration for ambiguity, broad scope, objectivity
Integrated	I-6	*Add:* Reconciling inner conflicts, renunciation of unattainable	*Add:* Cherishing of individuality	*Add:* Identity	

NOTE: "*Add*" means in addition to the description applying to the previous level

*Source: Loevinger (1976, p24:– 25)

Appendix 2.1(A) : A List of Maslow's 16 Propositions*

P1 : The individual as an integrated whole
P2 : Hunger as paradigm
P3 : Means and ends
P4 : Desire and culture
P5 : Multiple motivations
P6 : Motivation states
P7 : Relationships of motivations
P8 : List of Drives
P9 : Classification of Motivational life
P10: Motivation and animal data
P11: Environment
P12: Integration
P13: Nonmotivated behaviour
P14: Possibility of Attainment
P15: Influence of reality
P16: Knowledge of healthy motivation

(For elaboration, see Maslow, 1970, Chapter 3)

*Except the numbering system, all phrases etc are citations from source materials.

Appendix 2.1(B) : Maslow's Hierarchy of Basic Needs
(Source: Maslow, 1970, Chapter 4)

Physiological Needs.

In general, physiological needs refer to the needs for hunger, thirst, sex, sleep etc. They are the most prepotent of all basic needs.

Safety Needs.

It includes the needs for "security; stability; dependency; protection; freedom from fear, from anxiety

and chaos; need for structure, order, law, limits; strength in the protector; and so on." (p.39)

Belongingness and Love Needs

It includes the needs for friends, "or a sweetheart, or a wife, or children" (p.43), that is, the needs for "affectionate relations with people in general, namely, for a place in his group or family." (p.43) Belongingness needs can be generalized to include the needs for the identification with one's roots, one's origins and one's group.

Esteem Needs

(i) Needs for Esteem from others

It is "the desire for reputation or prestige (defining it as respect or esteem from other people), status, fame and glory, dominance, recognition, attention, importance, dignity, or appreciation." (p.45).

(ii) Self-esteem Needs.

It is "the desire for strength, for achievement, for adequacy, for mastery and competence, for confidence in the face of the world, and for independence and freedom" (p.45). "Satisfaction of the self-esteem need leads to feelings of self-confidence, worth, strength, capability, and adequacy, of being useful and necessary in the world." (p.45)

Self-actualization Needs

"It refers to man's desire for self-fulfillment, namely, to the tendency for him to become actualized in what he is potentially. This tendency might be phrased as the desire to become more and more what one idiosyncratically is, to become everything that one is capable of becoming." (p.46)

Appendix 2.1(C): MAslow's Concept of Self-actualization
(Source: Maslow, 1970, Chapter 11)

S1 : More efficient perception of reality and more comfortable relations with it.
S2 : Acceptance (self, others, nature)
S3 : Spontaneity; Simplicity; Naturalness
S4 : Problem Centering
S5 : The Quality of Detachment; The Need for Privacy
S6 : Autonomy; Independence of Culture and Environment, Will; Active Agents
S7 : Continued Freshness and Appreciation
S8 : The Mystic Experience; The Peak Experience
S10: Interpersonal relations
S11: The Democratic Character Structure
S12: Discrimination between means and ends, between good and evil
S13: Philosophical, unhostile sense of humor
S14: Creativeness$_{SA}$
S15: Resistance to enculturation; the transcendence of any particular culture.

APPENDIX 2.2. Glossary

The following quotations explain the key terms which are relevant to the discussion in Section 2.2.

Altruism : (Sociobiological Definition) "Behaviour that reduces the Darwinian fitness of the performing individual while increasing that of the recipient. Biological theories for the evolution of altruism involve primarily group selection, kin selection, and parental manipulation. By this definition, reciprocity does not involve altruism since it is essentially selfish." (Barash, 1977, p.325).

It is interesting to contrast the definition of altruism in Sociobiology with that in Psychology. Unlike sociobiologists, psychologists do not have an universally accepted definition of altruism. Two common ones are:

(i) Leeds (1963) gives three criteria of altruism:
"1. The person who engages in giving, treats it as an end in itself. He anticipates no other satisfaction or gain than the pleasure of contributing to the welfare of others.
2. The person gives voluntarily. He is acting beyond the call of duty and not fulfilling stipulated role obligations.
3. On balance, the person 'is doing good' as judged by the recipient and spectators to the action." (p.230-231)

(ii) Bar-Tal (1976) constructs the following definition based on Berkowitz (1972) and Krebs (1970):
Altruistic behaviour
"1. Must be carried out voluntarily
2. Must aim to benefit another
3. Must be carried out without expectation of a reward." (p.5)

This definition is also used in Section 3.3

Fitness or Genetic Fitness

> "The contribution to the next generation of one genotype in a population relative to the contributions of other genotypes. By definition, this process of natural selection leads eventually to the prevalance of the genotypes with the highest fitness." (Wilson, 1975, p.585)

Genotype:

> "The genetic constitution of an individual organism, designated with reference either to a single trait or to a set of traits." (Wilson, 1975, p.585)

Inclusive Fitness

> The sum of an individual's fitness as measured by personal reproductive success and that of relatives devalued in proportion to their genetic distance, i.e., as they share fewer genes. Inclusive fitness is the accumulated consequences of kin selection for any individual." (Barash, 1977, p.329)

Natural Selection

> "The differential contribution of offspring to the next generation by individuals of different genetic types but belonging to the same population. This is the basic mechanism proposed by Charles Darwin and is generally regarded today as the main guiding force in evolution." (Wilson, 1975, p.589)

> "Differential reproduction of individuals; the tendency for some individuals to produce more successful offspring than others...." (Barash, 1977, p.330)

Phenotype: "The observable properties of an organism as they have developed under the combined influences of the genetic constitution of the individual and the effects of environmental factors." (Wilson, 1975, p.591)

Social (or Sociocultural) Evolution:

> "By sociocultural evolution we mean, at a minimum, a selective cumulation of skills, technologies, recipes, beliefs, customs, organizational structures, and the like, retained through purely social modes of transmission, rather than in the genes." (Campbell, 1975, p.1104)

APPENDIX 2.3 (A) Basic Assumptions of Piaget's Theory of Cognitive Development

(1) "**Intelligence** constitutes an organising activity whose functioning extends that of the biological organization, while surpassing it due to the elaboration of new structures." (Piaget, 1953, p.407). In other words, it is assumed that the biological body presents an organized structure of intelligence which constitutes a system of interdependent and internal relationships.

(2) The development of intelligence, or as Piaget puts it, cognition, involves basic transformation of the above-mentioned organized structure of intelligence or cognition.

(3) Development of cognitive structure results from the interaction between the biological organism and the environment. The processes of interaction are explained by Piaget's theory of adaptation, assimilation and accommodation. (Piaget, 1953, 1971; Piaget & Inhelder, 1969).

(4) Cognitive structures are schemata of action.(Piaget, 1971, p.6-8). Schemata of action refers to anything in an action that can be "transposed, generalised, or differentiated from one situation to another." (Piaget, 1971,p.7) It is assumed that the development of different cognitive stages (from sensorimotor stage to formal operation stage) is an organization of such schemata of action upon objects.

(5) The development of cognitive structures is directed and motivated toward greater equilibrium in the interaction between the organism and environment. That is to say, the new cognitive schemata is assumed to be "built up by a progression of equilibration and autoregulations."(Piaget, 1971, p.13)

In short, Piaget and his followers do not agree that the development of intelligence is a natural result of maturation, or a direct result of learning due to association or reinforcement. Instead, they postulate the above assumptions.

APPENDIX 2.3 (B) The Concept of Cognitive Stages

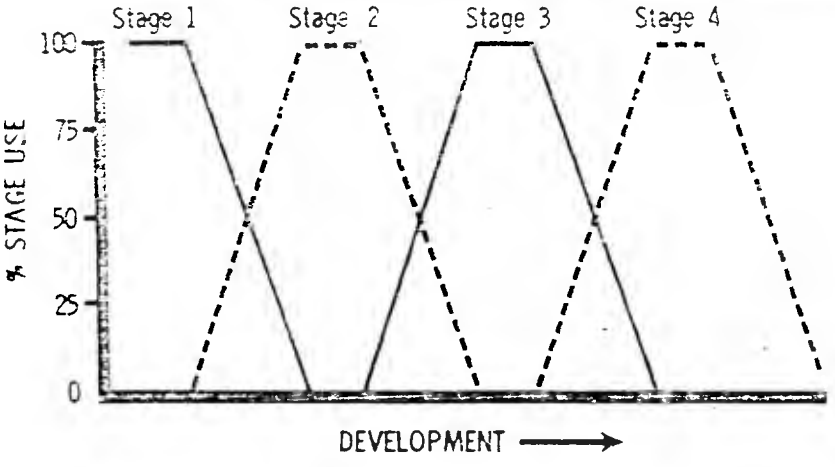
(1) Each stage refers to a series of constant schemata actions. The structures correspond to different stages are qualitatively different. However, they "still serve the same basic function (e.g. moral judgment or decision) at various points in development." (Colby et. al, 1979 (I) p.6; Kohlberg, 1969, p.348-349)

(2) Each stage is determined by a whole structure, an underlying thought organization, which characterises all schemata actions that belong to it.

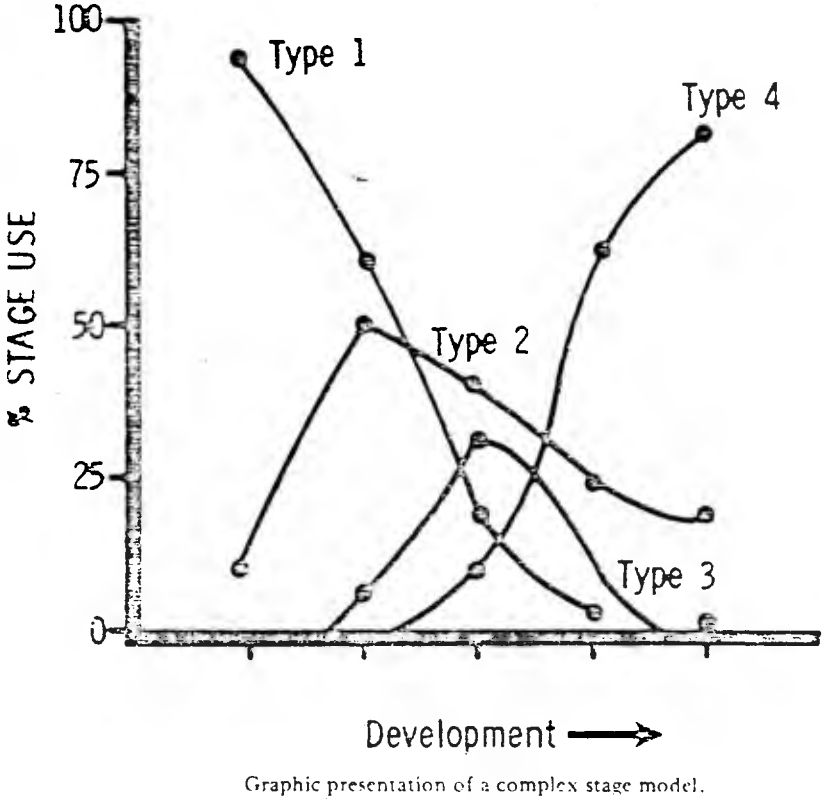
(3) Cognitive stages form a hierarchy. "Each one is prepared by the preceding one and integrated into the one that follows." (Piaget, 1971, p.17)

(4) The sequence of the stages is invariant for all persons and cultures. Nevertheless, cultural, environmental and genetic factors can speed up or slow down the development.

APPENDIX 2.3 (C) Graphical Representation of the Simple Stage and Complex Stage Models (Source: Rest,1979b)



Graphic presentation of the simple stage model.



Graphic presentation of a complex stage model.

APPENDIX 2.3 (D)*

PIAGET'S THEORY OF MORAL JUDGMENT

Introduction

Following his theory of cognitive development, Piaget(1932) attempted to study the morality of the child by examining his structure of moral judgments. He was quite aware of the defects of his "narrow scope". In the Foreword of his book: The Moral Judgment of the Child (1932), he writes, "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". However, he also argues that "There is no behaviour pattern, however intellectual, which does not involve affective features as motives; but, reciprocally, there can be no affective states without the intervention of perceptions or comprehensions which constitute their cognitive structure." (Piaget & Inhelder, 1969,

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* This appendix is a reprint of Ma, 1980, p.25 - 33 with slight modification.

p.158). In other words, cognitive and affective aspects of moral development are parallel, inseparable and highly inter-related.

Piaget and his associates collected their data through conversations with children. Sometimes, Piaget talked with the child about his thinking on the rules of game, for example, the game of marbles. More often, Piaget or his associates started the interview with a child by first reading him a story or pair of stories about some moral events involving children. Then the experimenter asked the child a few questions based on the stories. One pair of stories is concerned with John and Henry. In the first story, John opened a door and broke unintentionally fifteen cups which were placed on a chair behind the door before he came in. In the second story, Henry tried to get some jam out of the cupboard when his mother was out and broke one cup. The subjects were asked the following questions: "Are these children equally guilty? Which of the two is the naughtiest, and why?" (Piaget, 1932, p.118-119)

The main disadvantage of Piaget's experimental methodology, as he admits, is that one may tend to make the child "say whatever one wants him to say".(Piaget, 1932, p.vii).

The studies of Piaget had generated a lot of researches on children's moral thinking, which led to the establishment of the cognitive developmental moral theory.

Two Major Moral Stages: Heteronomy and Autonomy

In his studies, Piaget identified two major stages of moral

judgment. 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 co-operation. There are some distinctly different features or characteristics, which Lickona (1976a p.220) calls moral dimensions, between the two moral stages. The following is a brief description of these moral dimensions: (adapted from Lickona 1976, with modification and elaboration).

(1) Egocentric viewpoint vs Awareness of differing viewpoints:
The young child, of age seven or smaller, often finds difficulty in understanding differences in points of view between the speakers and therefore in decentration." (Piaget & Inhelder, 1969, p. 118). On the other hand, the elder child is aware of other's own reasoning from a third-person perspective.

(2) Unilateral respect vs Mutual respect:
The unilateral respect refers to the one-sided respect paid by a young child (Age: 3-7) to his parents or authorities in the process of conforming his behaviour to the adults' constraints. On the other hand, mutual respect takes place in the Autonomy stage. Mutual respect within peer groups results in rational rules, co-operation and equality. The concept of unilateral respect leads to the definition of "duty as obedience to authority", while mutual respect defines "duty as allegiance to principles of equality and concern for the welfare of others." (Lickona, 1976a, p. 220).

(3) Rules as unchangeable vs Rules as flexible:
For a young child, rules are sacred, traditional and un-

changeable.

> "A rule is therefore not in any way something elaborated, or even judged and interpreted by the mind; it is given as such, ready made and external to the mind." (Piaget, 1932, p. 106).

For the elder child, the rules are flexible realities and can be changed upon mutual agreement.

(4) Immanent Justice vs Naturalistic conceptions of Punishment:

The young child believes in 'immanent justice' which Piaget 1932, p.250) defines as the belief in "the existence of automatic punishments which emanate from things themselves". The basic assumption of the principle of immanent justice is that natural forces are always in the hands of adults and ensure that the disobedient will be punished. This belief tends to disappear as the child grows up. The elder child does not believe that justice is tied to adults or authorities and that punishing innocent people for the offence of others, that is group punishment, is not right.

(5) Objective responsibility vs Consideration of the actor's intention:

The young child evaluates "acts in accordance with the motive that has prompted them but in terms of their exact conformity with established rules". (Piaget, 1932, p. 107). This is what Piaget defines as 'objective responsibility'. On the other hand, the elder child evaluates acts with a consideration of the actor's intention.

(6) What is wrong is what is punished vs what is wrong is what violates the spirit of co-operation.

The young child takes the assumption that moral rules are external and rooted in adults and authorities. It follows

naturally that those who are punished by adults must have done something wrong. However, the elder child would think that moral wrong doings are what violate the spirit of co-operation and mutual respect among peer groups.

(7) Expiatory punishment vs Reciprocity-based punishment.

The young child believes in expiatory or arbitrary punishment. He thinks that "the only way of putting things right is to bring the individual (wrongdoer) back to his duty by means of a sufficiently powerful method of coercion and to bring home his guilt to him by means of painful punishment." (Piaget, 1932, p. 203). The form of punishment can be arbitrarily determined by adults. The young child also tends to think that the severer the punishment the better. The elder child sees punishment differently. He believes in punishment by reciprocity which is based on the spirit of co-operation and rules of equality. That is to say, the punishment should be as far as possible fit the wrongdoing.

(8) Retributive justice vs Distributive Justice:

Retributive justice refers to the belief that each should be awarded according to the arbitrary and unequal distribution of rewards by adults. The young child believes in retributive justice while the elder one believes in distributive justice, which refers to the belief of equal distribution of rewards. That is, equality should prevail over authority.

(9) Authority's punishment of peer aggression vs Revenge by the victim:

Most of the young children and "a few of the elder ones think

that one should not take one's revenge." (Piaget, 1932, p.299) because there is a more legitimate way -- to report the aggression to adults and they would punish the aggressor fairly. On the contrary, most of the elder children believe in the concept of reciprocity and think that "one should give back exactly what one has received, but not invent a sort of arbitrary punishment whose content bears no relation to the punishable act" (p. 299)

Piaget (1932) asserts that all children develop their moral judgment from Heteronomy stage to Autonomy stage. In addition, there is a premoral stage before the Heteronomy stage. However, the thought processes underlying these two major stages are partially overlapping. In addition, the Autonomy stage "gradually succeeds in dominating" (p. 129) the Heteronomy stage. In other words, these two moral attitudes "may co-exist at the same age and even in the same child, but broadly speaking, they do not synchronize." (p. 129)

In addition, Piaget (1932, p. 407-411) postulates a parallelism between the child's moral judgment and his intellectual development. The young child's morality of constraint is accounted for by two major factors. The first is the child's egocentrism or his logical incapability to distinguish "what belongs to things and other people from what is the result of his own particular intellectual and affective perspective." (p. 407). The second is the child's unilateral respect for adults. "From the intellectual point of view, this respect gives rise to an 'annunciatory' conception of truth." (p. 408). Moreover, it causes the young child to treat moral rules as external, ready-made and unchangeable. As the intelligence of the

child develops from pre-operational thinking to operational thinking, he begins to realize the spirit of co-operation, the principles of reciprocity and equality, the third person perspective, and a concern of the welfare of others. He then transits from the Heteronomy stage to the Autonomy stage.

A Critique of Piaget's Theory

The following outline is a critique of Piaget's theory of moral judgment, based on the work of Lickona (1976a), Graham (1972), Bull (1969) and Bloom (1959):

(1) Piaget deliberately ignores the affective or non-cognitive aspects of moral development (Graham, 1972, p. 203). People sometimes said that the cognitive developmental moral theory is too rational. However, as we mentioned before, Piaget and his followers (Piaget and Inhelder, 1969, p. 158; Kohlberg, 1976, p. 48; Colby et al 1959 (I), p. 2; Hersh et al, 1979, p. 38) argue that the cognitive and affective aspects are parallel, inter-related and inseparable. Now questions arise. To what extent and in what ways are the cognitive and affective aspects inter-related? How do we account for moral behaviour arising from basic or safe needs? It seems, by experience, an individual including people of high moral stage often act in different ways with different people (parents, friends or strangers) in a similar or equivalent moral situation, how do we account for this by Piaget's theory?

(2) Piaget's discussion of the learning of moral judgment is problematic. His model of learning is "a rather old-fashioned behaviouristic stimulus-response framework, with the stimulus

being social pressure in one form or another." (Bloom, 1959, p. 7). He simply ignores the processes of social learning, identification and internalization. (Graham, 1972, p. 203). In addition, he neglects the effect or impact of explicit and rational teaching of morality on the child (Wright, 1971, p. 159). In short, Piaget does not explain adequately how the child learns and develops his moral judgment.

(3) Bull (1969, p. 138) argues that Piaget "always happily secures single and clear-cut responses. The great majority of ours (Bull & his associates), however, are mixed and complex to a degree." Bull supports his argument by presenting a comparative study of the cheating test. His findings differ from Piaget's significantly. (p. 139).

(4) Piaget (1932) argues that children respond consistently within a particular judgmental area and that children's moral thinking form a consistent pattern. In other words, stages of development exist in children's moral judgment. However, Lickona (1976, p. 229), in a review, finds that, "the available research does not reveal a clear clustering of Piagetian moral judgments.-- the various features of Heteronomous and Autonomous morality are best viewed as relatively distinct developmental dimensions." Kohlberg (1969, p. 375) also argues that, "a number of the dimensions of moral judgment studied by Piaget are really matters of

content rather than cognitive form". In addition, he criticizes Piaget's forced choice stories are not good for obtaining genuine and free responses from children.

(5) Many other comments, which can well be applied to any founder of a theory, have been made on Piaget's moral researches. For example, Piaget is criticized to be narrow-scoped: he tends to ignore some aspects, over-emphasizes the others: he defines some terms ambiguously, and over-generalizes his findings. Some other comments are: in Piaget's "overwhelming concern with heteronomy and equality, he ignores anomy, whereas we (Bull & his associates) find it at all ages. " (Bull, 1969, p. 139) "Piaget is cavalier in rejecting any response that smacks of the 'adult sermon' "(Bull, 1969, p. 139); Piaget does not extend his studies beyond the age of twelve, thus fails "to come to grips with the development of true autonomy, which only properly emerges during adolescence." (Graham. 1972, p. 204); "Piaget does not give sufficient attention to individual differences or to sex, social class or cultural differences.. Piaget virtually ignores the whole question of moral conflicts.. Piaget's notion of 'reciprocity' is too wide". (Graham, 1972, p. 205) etc.

On the other hand, many empirical studies support Piaget's basic argument that there is a positive and significant relationship between cognitive development and moral development. A detailed review is given by Lickona (1976a).

Despite the above criticism, most of the psychologists (Bull, 1969, p. 151; Bloom, 1959, p. 11; Wright, 1971, p. 153) agree that Piaget's contribution is significant and outstanding. Bull (1969, p. 15) writes:

> "Such a brilliant analysis of development in the moral concepts of the child made Piaget the outstanding pioneer in this field. All subsequent studies must be indebted to him in some sense."

APPENDIX 2.3 (E)

KOHLBERG'S STAGES OF MORAL DEVELOPMENT

LEVEL A: Preconventional level

Stage 1: The Heteronomous Stage

Content of Stage

Right is blind obedience to rules and authority, avoiding punishment, and not doing physical harm.

a) What is right is to avoid breaking rules backed by punishment, obedience for its own sake, and avoiding physical damage to persons and property.

b) The reasons for doing right are avoidance of punishment and the superior power of authorities.

Social Perspective of Stage:

Egocentric point of view. Doesn't consider the interests of others or recognize that they differ from actor's. Doesn't relate two points of view. Actions are considered physically rather than in terms of psychological interests of others. Confusion of authority's perspective with one's own.

Stage 2: The stage of Individualism and Instrumental Purpose and exchange

Content of Stage:

Right is serving one's own or other's needs and making

fair deal in terms of concrete exchange.

a) What is right is following rules only when it is to someone's immediate interest. Right is acting to meet one's own interests and needs and letting others do the same. Right is also what is fair, that is, what is an equal exchange, a deal, an agreement.

b) The reason for doing right is to serve one's own needs or interests in a world where you have to recognize that other people have their interests, too.

Social Perspective of Stage:

Concrete individualistic perspective. Separates own interests and points of view from those of authorities and others. Aware everybody has their own interest to pursue and these conflict, so that right is relative (in the concrete invididualistic sense). Integrates or relates conflicting individual interests to one another through instrumental exchange of services, through instrumental need for the other and the other's good will, or through fairness as treating each individual's interest as equal.

LEVEL B: Conventional Level

Stage 3: The Stage of Mutual Interpersonal Expectations, Relationships, and Interpersonal Conformity

Content of Stage:

The right is playing a good (nice) role, being concerned about the other people and their feelings, keeping loyalty and trust with partners, and being motivated to follow rules and expectations.

a) What is right is living up to what is expected by people close to you or what people generally expect of people in your role as son, sister, friend, etc.

"Being good" is important and means having good motives, the showing of concern about others. It also means keeping mutual relationships, maintaining trust, loyalty, respect, and gratitude.

b) Reasons for doing right are: 1) the need to be good in your own eyes and those of others, 2) your caring for others, and 3) because if you put yourself in the other guy's place you would want good behavior from the self (Golden Rule).

Social Perspective of Stage:

Perspective of the individual in relationship to other individuals. Aware of shared feelings, agreements, and expectations which take primacy over individual interests. Relates points of view through the "concrete Golden Rule," putting yourself in the other person's shoes. Does not consider generalized "system" perspective.

Stage 4: The Social System and Conscience Stage

Content of Stage:

The right is doing one's duty in society, upholding the social order, and the welfare of society or the group.

a) What is right is fulfilling the actual duties to which you have agreed. Laws are to be upheld except in extreme cases where they conflict with other fixed social duties. Right is also contributing to society, the group, or institution.

b) The reasons for doing right are to keep the institution going as a whole, "what if everyone did it," or self-respect or conscience as meeting one's defined obligations.

Social Perspective of Stage:

Differentiates societal point of view from interpersonal agreement or motives. Takes the point of view of the system which defines roles and rules. Considers individual relations in terms of place in the system.

B/C Transitional Level

This level is postconventional but not yet principled.

Content of Transitional Stage(s):

4(5) Obligation to our conscience orientation. Aware of relativity of different social standards, so orients to personal moral values or conscience. "Conscience," however, is the internalized social standards of Stage 4. One has a duty to follow one's conscience. There may be an objective external moral law expressing the essence of social morality.

4-1/2 Choice is personal and subjective. It is based on emotions and hedonism rather than conscience, since conscience is seen as arbitrary and relative, as are terms like "duty," "morally right," etc.

5(4) Decision is personal and subjective unless it impinges on rights of others. Morality is arbitrary and relative because one has the right to free choice. Rights, however, are bounded by the like rights of others.

Transitional Social Perspective

Subjective and "outside of society." The perspective is that of an individual standing outside of his own society and considering himself as an individual making decisions without a generalized commitment or contract with society. One can pick and choose obligations which are defined by particular societies, but one has no principles for such choice.

C. Postconventional and Principled Level

Such decisions are generated from rights, values, or principles which are (or could be) agreeable to all individuals composing or creating a society that would have fair and beneficial practices.

Stage 5: The Stage of Social Contract or Utility and of Individual rights

Content of Stage:

The right is upholding the basic rights, values, and legal contracts of a society, even when they conflict with the concrete rules and laws of the group.

a) What is right is being aware of the fact that people hold a variety of values and opinions, that most values and rules are relative to your group. These "relative" rules should usually be upheld, however, in the interest of impartiality and because they are the social contract. Some non-relative values and rights like life and liberty, however, must be upheld in any society and regardless of majority opinion.

b) Reasons for doing right are, in general, that Stage 5 individuals feel obligated to obey the law because they have made a social contract to make and abide by laws for the good of all and to protect their own rights and the rights of others. They feel that family, friendship, trust, and work obligations are also commitments or contracts they have freely entered into and entail respect for the rights of others. They are concerned that laws and duties be based on rational calculation of overall utility, "the greatest good for the greatest number."

Social Perspective of Stage:

Prior to society perspective. Perspective of a rational individual aware of values and rights prior to social attachments and contracts. Integrates perspectives by formal mechanisms of agreement, contract, objective impartiality and due process. Considers "moral point of view," "legal point of view," recognizes they conflict and finds it difficult to integrate them.

Stage 6: The Stage of Universal Ethical Principles

Content of Stage:

Guidance by universal ethical principles which all humanity should follow.

a) What is right: Stage 6 is guided by self-chosen ethical principles. Particular laws or social agreements are usually valid because they rest on such principles. When laws violate these principles, one acts in accordance with the principle. Principles are universal principles of justice: the equality of human rights and respect for the dignity of human beings as individual persons. These are not merely values which are recognized, they are principles used to generate particular decisions.

b) The reason for doing right is that, as a rational person, the Stage 6 individual has seen the validity of principles and has become committed to them.

Social Perspective of Stage:

Perspective of a "moral point of view" from which social arrangements derive or on which they are grounded. The perspective is that of any rational individual recognizing the nature of morality or the basic moral premise of respect for other persons as ends, not means.

(Source: Kohlberg, 1976; p.34-35 Colby et. al., 1979, p.24-28)

APPENDIX 2.4 Lao Tzu and Chuang Tzu: Original Quotations in Chinese

Apart from one exception (*13), Bahm's (1958) translation of Lao Tzu is quoted in the text and Lau's (1963) quoted here.

Abbreviations used below:
Bahm: Bahm (1958)
Lau: Lau (1963)
老：老子：道德經。例："老 18" 指老第 18 章
老子中文原文乃根據嚴靈峯(1954)內附錄一之
老子道德經原文。
嚴：嚴靈峯(1954)
郭：郭慶藩(輯)(1961)。郭一指郭第一冊。如此類推

*1: 「慧智出，有大僞」(老 18；嚴，頁 153)
"When knowledge becomes highly abstract, men are deceived by mistaking abstraction for realities." (/Bahm, p.25)

*2: 「絕聖棄智，民利百倍」(老 19；嚴，頁 153)
"Exterminate the sage, discard the wise,
And the people will benefit a hundredfold" (Lau, p.75)

*3: 「不出戶，知天下；不闚牖，見天道。其出彌遠，其知彌少。
是以聖人不行而知，不見而名，不為而成。」(老 47；嚴，頁 60)

"Without stirring abroad
One can know the whole world:
Without looking out of the window
One can see the way of heaven.
The further one goes
The less one knows.
Therefore the sage knows without haveing to stir,
Identifies without having to see,
Accomplishes without having to act." (/Lau, p. 108)

*4:「太上下知有之，其次親而譽之，其次畏之，其次侮之」（老17；嚴，頁153）
"The best of all rulers is but a showy presence to his subjects.
Next comes the ruler they love and praise:
Next comes one they fear:
Next comes one with whom they take liberties."
(/Lau, p.73)

*5:「不見可欲，使民心不亂」（老3；嚴，頁149）
"not to display what is desirable will keep them from being unsettled of mind." (/Lau, p.59)

*6:「馳騁畋獵，令人心發狂；難得之貨，令人行妨」（老12；嚴，頁151）
"Riding and hunting
Make his mind go wild with excitement;
Goods hard to come by
Serve to hinder his progress" (/Lau, p.68)

*7:「民溼寢則腰疾偏死，鰌然乎哉？木處則惴慄恂懼，猿狙然乎哉？三者孰知正處？民食芻豢，麋鹿食薦，蝍蛆甘帶，鴟鴉耆鼠，四者孰知正味？……自我觀之，仁義之端，是非之塗，樊然殽亂，吾惡能知其辯！」（莊子齊物論第二；郭一，頁93）

*8:「小國寡民，使有什伯之器而不用，使民重死而不遠徙。雖有舟輿，無所乘之；雖有甲兵，無所陳之；使人復結繩而用之。甘其食，美其服，安其居，樂其俗；鄰國相望，鷄犬之聲相聞；民至老死，不相往來。」（老80；嚴 頁168）

"Reduce the size and population of the state. Ensure that even though the people have tools of war for a troop or a battalion they will not use them; and also that they will be reluctant to move to distant places because they look on death as no light matter.
Even when they have ships and carts, they will have no use for them; and even when they have armour and weapons, they will have no occasion to make a show of them.
Bring it about that the people will return to the use of the knotted rope,
Will find relish in their food
And beauty in their clothes,
Will be content in their abode
And happy in the way they live.
Though adjoining states are within sight of one another, and the sound of dogs barking and cocks crowing in one state can beheard in another, yet the people of one state will grow old and die without having had any dealings with those of another."
(/Lau, p.142)

*9:「是故鳧脛雖短，續之則憂；鶴脛雖長，斷之則悲．故性長非所斷，性短非所續，無所去憂也．」(莊子外篇馬蹄第八；郭二，頁317)

*10:「含德之厚，比於赤子」(老55；嚴，頁162)

"One who possesses virtue in abundance is comparable to a new born babe" (/Lau, p.116)

*11:「人之生也柔弱，其死也堅強．萬物草木之生也脆弱，其死也枯槁．故堅強者死之徒，柔弱者生之徒．」(老76；嚴，頁167)

"A man is supple and weak when living, but hard and stiff when dead. Grass and trees are pliant and fragile when living, but dried and shrivelled when dead. Thus, the hard and the strong are the comrades of death; the supple and the weak are the comrades of life." (/Lau, p.138)

*12:「天下莫柔弱於水，而攻堅強者莫之能勝，其無以易之．弱之勝強，柔之勝剛，天下莫不知，莫能行．」(老78；嚴，頁168)

"In the world there is nothing more submissive and weak than water. Yet for attacking that which is hard and strong nothing can surpass it. This is because there is nothing that cab take its place.
That the weak overcomes the strong,
And the submissive overcomes the hard,
Everyone in the world knows yet no one can put this knowledge into practice." (/Lau, p.140)

*13:「不欲以靜，天下將自定」(老37；嚴，頁158)

"And if I cease to desire and remain still,
The empire will be at peace of its own accord."
(/Lau, p.96)

*14:「古之真人，不逆寡，不雄成，不謨士。若然者，過而弗悔，當而不自得也。」(莊子內篇大宗師第六；郭一，頁226)

*15:「古之真人，不知說生，不知惡死；其出訢。其入不距；翛然而往，翛然而來而已矣。」(莊子內篇大宗師第六；郭一，頁226)

*16:「若然者，其心志，其容寂，其顙頯；淒然似秋，煖然似春，喜怒通四時，與物有宜而莫知其極。」(莊子內篇大宗師第六；郭一，頁230-231)

*17:「古之真人，其狀義而不朋，若不足而不承；與乎其觚而不堅也，張乎其虛而不華也；----」(莊子內篇大宗師第六；郭一，頁234)

*18:「---故曰，至人无己，神人无功，聖人无名。」(莊子內篇逍遙遊第一；郭一，頁17)

APPENDIX 2.5

(A) Pugh's Value-Driven Decision Model

1. Definition of "value-driven decision system"

In most artificial decision system, a numerical value is assigned to each alternative of outcomes in order to determine which alternative is "best". "The designer of the system specifies a procedure by which such "values" are to be calculated. The decision system then uses this procedure to calculate a numerical "value" for the outcome of each alternative that is considered. A "decision" is made simply by selecting the alternative with the highest computed "value". The specified value algorithm, therefore, determines the choices. In effect, it drives the decision system." (Pugh, 1977, p.28). Such decision systems are called "value-driven" decision systems.

2. Some principles Underlying Human Values.

(i) The Principle of Multiple Values

A set of multiple values, instead of a single one, is needed in order to "provide satisfactory adaptive behavion in a complex environment." (p.66) Therefore, "there are many different biological drives, many distinct emotions, and many different valuative sensations such as good and bad tastes, smell, and tactile sesations.)" (p.66)

(ii) The Principle of Time-dependent Values

Though the ultimate evolutionary objective (survival of species) appears to be constant of time, the primary values are time-dependent and situation-dependent. Research in artificial decision systems shows that "time-dependent values can provide a more practical design

approach, even when the ultimate objectives are independent of time." (p.71)

(iii) The use of secondary values

It is necessary to use secondary values to simplify the decision-making process, otherwise it may be necessary for the system to explore all possible combinations of outcomes that might occur.

(iv) The Principle of Intellectual Values

Since both the capacity of the system and its intellectual resources are limited, it is necessary for the system to incorporate a set of intellectual values so as to allocate the intellectual resources wisely. One basic use of the intellectual value is to provide a decision system "some criterion for deciding when to stop worrying about a specific problem." (p.94) Since "intelligent biological organisms have a very wide repertoire of intellectual behavior" (p.84), the structure of human intellectual values is quite complex. It may include curiosity; humor; criteria of simplicity, comprehensiveness, and elegance; and esthetic values.

(v) The Hierarchical Design Principle

A hierarchical decision structure is used to give efficient decision-making processes. It simplifies "the strategic decision level by delegating tactical decisions to a process that can be carried out after the strategic decisions have been made." (p.95) Normally, the top level in the hierarchy deals with basic policy-making or strategic decision while the lower levels implement the decision.

B. Broadbent's Information Flow Model.

The following quotations are chosen mainly to explain the mechanism of the short term store and Selective Filter.

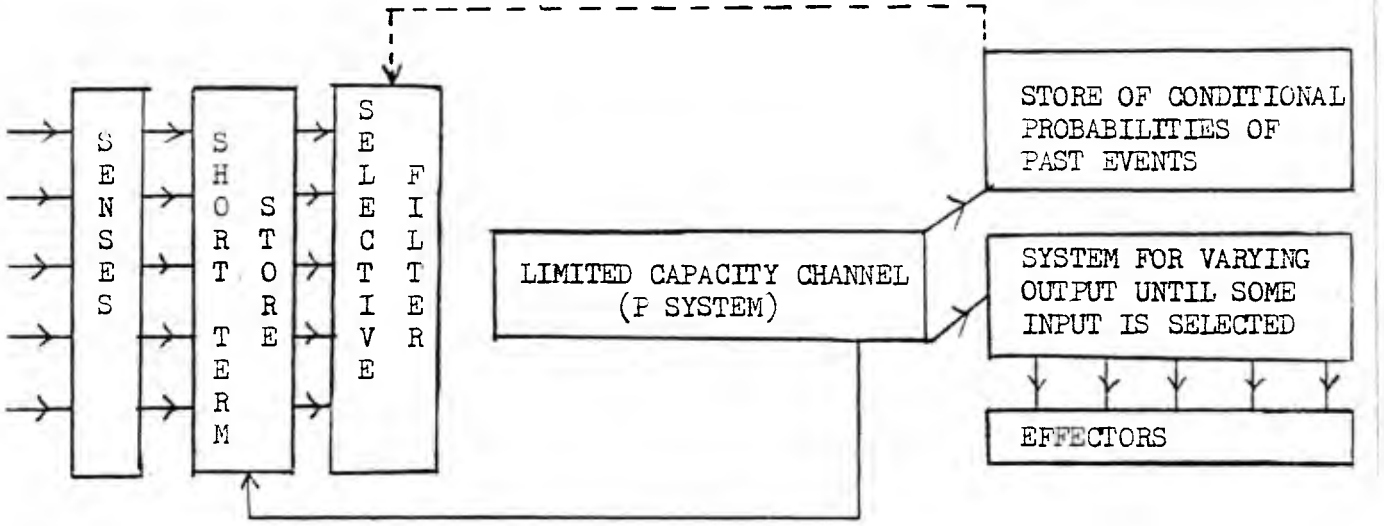


Figure A.2.1 Broadbent's Model (Broadbent, 1971, p.10)

A nervous system is regarded as a single communication channel of limited capacity. This means that "a man will be unable to manage within a fixed period of time to cope with more than a certain number of signals." (Broadbent, 1971, p.8).

The amount of information received by the senses of an organism is enormous. For the limited capacity system to work efficiently, a Selective Filter would pass only some of the incoming information. The filter operates "by selecting those stimulus events which possessed some common feature, such as coming from a certain spatial location...." (p.9)

The filter is preceded by a buffer or short term store, "which could hold any excess information arriving by channels other than the one selected; so that if signals A and B arrived simultaneously the filter could select first A then B even though the time of arrival of B was some way past when A had been dealt with by the limited capacity system. The information about B would however decay with time" (p.10) and after a time of the value of under one second would have become unusable.

APPENDIX 3 A Summary of the Notations Used in Chapter 3

Notation	Definition
N	Psychological Needs Parameter
N_i	The ith type of Psychological Needs in the Hierarchy of N
α	Coefficient of gratification of Psychological Needs (N)
$\alpha_{ik(t)}$	Instantaneous value of α with respect to N_i need for a person of T_k years old at time t
α_{ik} (or $\overline{\alpha_{ik}}$)	Average value of $\alpha_{ik}(t)$ over a sufficiently large time t_o
α°_{ik}	Threshold value of α_{ik}. (It is the minimum average value above which the N_i need can be regarded as "relatively well gratified")
R	Human Relationships Parameter
R_i	The ith group in the Hierarchy of Human Relationships (R)
β_{ik}	Coefficient of Human Relationships with respect to the R_i group for a person of T_k years old
J	Structures of Judgement Parameter
J_i	The ith Stage of Judgement in the Hierarchy of J.
γ_{ik}	Coefficient of Moral Judgement with respect to the J_i stage for a person of T_k years old

APPENDIX 4. A Derivation of the NRRJ01 and WNRRJ01 Indices

(1) $NR01 = (N415 + N51) - (N16 + N36)$

$RJ01 = (J4 + J5) - (J2 + J3)$

(2) $NRRJ01 = NR01 + RJ01$

$= \{(N415 + N51) - (N16 + N36)\} + \{(J4 + J5) - (J2 + J3)\}$

$= \{(N415 + J4) + (N51 + J5)\} - \{(N16 + J2) + (N36 + J3)\}$

$= (NRJ4 + NRJ5) - (NRJ2 + NRJ3)$

where $NRJ2 = (N16 + J2)$

$NRJ3 = (N36 + J3)$

$NRJ4 = (N415 + J4)$

$NRJ5 = (N51 + J5)$

(3) Similarly,

$WNRRJ01 = NR01 + 1.5 * RJ01$

$= (WNRJ4 + WNRJ5) - (WNRJ2 + WNRJ3)$

where $WNRJ2 = (N16 + 1.5 * J2)$

$WNRJ3 = (N36 + 1.5 * J3)$

$WNRJ4 = (N415 + 1.5 * J4)$

$WNRJ5 = (N51 + 1.5 * J5)$

APPENDIX 5

Notes:

(1) All the questionnaires attached here appear in their original forms except the Chinese MDT which is a reduced copy of its original form.
(2) The original questionnaires were in general printed on both sides.
(3) The page number only appears on the first page of each questionnaire.

Appendix 5(A) (i) MDT Form A

Directions

A number of social situations are given below. Each of the situations is followed by a set of questions to see what opinions you have. There are no "right" or "wrong" answers because everyone has the right to his or her own views.
Please answer all the questions as this is important when comparing different people's opinions.
Your answers are quite confidential.
Please provide us the following information:

Country of origin: _____

Name: _____ Age: _____ Years _____ Months. Sex: _____.

In the following paragraphs the instructions for answering the questionnaire are presented on one side with an example shown on the other side.

nstructions

lease read the paragraph carefully. Each aragraph is followed by a set of questions. he questions are divided into two parts: I nd II.

art I:

. Please tick the appropriate boxes to indicate your choices.
This example shows how someone has answered the sample question.

. In this example, the most definite choice was Arts, then Social Science. Either Medicine or Science came next, with Engineering and Music/ Fine Art not preferred.

. When you have filled in the grid, decide on the order in which you would place your top three choices and arrange them in order.

. In this case, it was easy to place X_2, then X_1 in order, but a decision had to be made between Medicine and Science as these were both ticked in the same column. Here Science (i.e. X_5) was chosen.

Example

Suppose you were asked to choose a subject (X) to study in a university. Would you choose X if X is _____ ?

Part I:
X: X_1 = Social Science (e.g. economics, sociology, psychology)
X_2 = Arts (e.g. history, languages, literature)
X_3 = Music or fine Art
X_4 = Medicine
X_5 = Science (e.g. Physics, Chemistry)
X_6 = Engineering

	Definitely YES	Strongly YES	Moderately YES	Can't decide	Moderately NO	Strongly NO	Definitely NO
X_1		✓					
X_2	✓						
X_3							✓
X_4			✓				
X_5			✓				
X_6						✓	

Select the top three choices and put them in order:

1st choice	2nd choice	3rd choice
X_2	X_1	X_5

*H.K. Ma, 5/1981.

Instructions

Part II:

1. You are asked to say, in your opinion, how important each of the following statements would be in deciding your answers in Part I.

Example

Part II:

IMPORTANCE:

Very Great	Great	Some	Little	No	
		✓			1. Whether my parents agree with my choice.
✓					2. Whether I feel I could do my best in a particular course.
			✓		3. Whether some particular subjects are more difficult than others.
✓					4. Could I get a good job after finishing a particular course ?
			✓		5. Whether some of my friends are keen to do the same course.
				✓	6. For X_5 only: Whether Albert Einstein is known to have been a great physicist or not.

2. If you are not certain of the meaning of a statement, or the statement sounds nonsense, mark it as "no importance".
For example, in Statement 6, if you do not know who Albert Einstein was, or you think that the content of this statement is irrelevant to your answers in Part I, mark it as "no importance".

3. Some statements in Part II are concerned with a particular choice X in Part I.
For example, the Statement 6 here is mainly concerned with the choice X_5 in Part I.

Put your top three statements in order of importance:

Most important	2nd most important	3rd most important
2	4	1

4. Please note that your choice of the three most important statements should be consistent with your ratings given in the grid.

Finally,

1. In Part I, please give the first answer that comes into your mind.
2. In each of the following situations, please answer the Part I questions before doing the Part II ones.

THANK YOU VERY MUCH FOR FILLING IN THE QUESTIONNAIRE
YOUR REPLIES WILL BE VERY HELPFUL TO US.

A Lost Bag

Suppose one day, when you are walking by yourself along a road, you discover a bag accidentally. You open it and find that the bag contains a lot of money, almost ten thousand pounds, and some documents showing that the money belongs to a big company. It so happens that for a particular reason X , you need a great deal of money immediately and there is no other way for you to obtain such a large amount of money except by keeping the money in the bag. Would you do so if the reason X is _____ ?

Part I:

X: X_1 = you have been accepted by a world-famous university abroad for a 2-year course which you earnestly desire to attend. However, there are no grants or scholarships available and the cost each year is about £5000.

X_2 = You are near death from a rare disease, which the doctors think may be cured only in a particular hospital in another country. The total expense will be about £10,000.

X_3 = Suppose it is a sister or brother who has the rare disease in the above case.

X_4 = You recently started your own business and in the past two years you have borrowed £10,000 from a bank. The bank manager tells you that you have to return all the money in two weeks' time because of unpaid interest, otherwise he will have to prosecute you.

X_5 = Suppose in the case X_4, it is your best friend who has borrowed £10,000 from the bank for his or her business. Sometime ago, you promised your friend that you would help him/her by all means when in need. Now your friend asks you to lend him/her £10,000.

X_6 = you want to buy a luxurious car for yourself.

	Definitely YES	Strongly YES	Moderately YES	Can't decide	Moderately NO	Strongly NO	Definitely NO
X_1							
X_2							
X_3							
X_4							
X_5							
X_6							

Select the top three choices and put them in order:

1st choice _____ 2nd choice _____ 3rd choice _____

A Lost Bag

Part II:

IMPORTANCE:

Very Great	Great	Some	Little	No	
					1. Whether my chance of being caught by the police is high or not.
					2. Is it a citizen's responsibility to report the lost bag to the police ?
					3. Whether the common belief that "we should not steal" applies in this case.
					4. For X_2 & X_3 only: Whether the right to survive is more important than the social responsibility that a citizen should normally show in this case.
					5. For X_2 & X_3 only: Does the society fail in meeting the basic claim of survival that I or my brother/sister should fairly expect ?
					6. For X_2 & X_3 only: Whether my friends and other people would forgive me for taking the money in the bag to cure the disease.
					7. For X_5 only: Should one try to keep a promise even by doing things against the law ?
					8. For X_6 only: Isn't it natural for one to try his/her very best to please himself/herself ?
					9. Whether the company which owns the bag of money has insured the money against loss.

Put your top three statements in order of importance:

Most important _____ 2^{nd} most important _____ 3^{rd} most important _____

The Sinking Boat

You and X are in a boat which is sinking, but only you or X can be rescued.

Would you sacrifice yourself so that X could be rescued if X is _____?

Part 1:

	Definitely YES	Strongly YES	Moderately YES	Can't decide	Moderately NO	Strongly NO	Definitely NO	X:
X_1								X_1 = a young stranger, 20 years old.
X_2								X_2 = an old stranger, 70 years old.
X_3								X_3 = a famous scientist who is also a Nobel prize winner.
X_4								X_4 = your brother or sister.
X_5								X_5 = your best friend.
X_6								X_6 = a postman.
X_7								X_7 = someone you don't like or an enemy.
X_8								X_8 = a child, 6 years old.
X_9								X_9 = your husband/wife or own child.*

*Ignore this item if it does not apply to you.

Select the top FOUR choices and put them in order:

1st choice	2nd choice	3rd choice	4th choice
_____	_____	_____	_____

The Sinking Boat

Part II:

IMPORTANCE:

Very Great	Great	Some	Little	No	
					1. Am I willing to suffer the terrible and painful experience of being drowned so that X could be rescued ?
					2. Is it my responsibility to sacrifice myself for X ?
					3. Is it too pitiless to see X die instead of me ?
					4. What my value and attitude is on how people should interact with each other.
					5. Should everyone try his/her very best to protect life by all means ?
					6. Should the right of X to decide whether he or she is willing to be rescued at the expense of my life be respected ?
					7. Isn't it natural for a person to take care of his/her relatives or friends in case of emergency ?
					8. Should everyone have the right to decide on his/her own whether or not to sacrifice for someone else ?
					9. Whether the religious belief (e.g. Christianity or Buddhism) that one should love others, and sacrifice for them when needed applies in this case.

Put your top three statements in order of importance:

Most important _____ 2nd most important _____ 3rd most important _____

A Doctor's Dilemma

Susan is a young medical doctor. She worked in a private hospital which had many rich patients and she earned a good salary. She is engaged to marry Peter who is also a doctor in the same hospital.

However, Susan had not felt very happy with her job over the last few years and decided to go to work as a voluntary doctor in a poor and underdeveloped country for at least five years. Her parents, Peter and her friends all objected strongly to her decision. Nevertheless she managed to overcome all the difficulties and is now working in a remote village where she is the only doctor. Susan feels very happy about her present job and is highly respected and loved by the villagers. After two years' work in the village, Susan is faced with a difficult problem X which has to be resolved either by staying or leaving and returning to her own country. Suppose you were Susan, would you give up the present job in the village if the problem X is _____?

Part I:

X: X_1 = her fiance Peter wrote to her and said that he could not wait any longer. If she is not going to return within a few months, he will not marry her.

X_2 = her mother suffers a stroke and is paralysed. She wants Susan to come back and look after her.

X_3 = because of the economic recession, the voluntary organization she is affiliated to has to stop the medical supplies to her clinic this year. The only way to maintain the clinic is to borrow a large amount of money from her friends.

X_4 = because there had been troubles in the country, terrorists are still in the bush and attack remote villages. Susan's village and clinic have been attacked twice already. Fortunately, she was not injured. Now her village is under constant threat.

X_5 = because of her failure to save the life of the son of the headman of the village, the headman is very angry and is going to force her to leave the country. The only way is to organize the villagers to stand on her side, which is obviously difficult to do.

X_6 = many countries, including Susan's original one, are suffering from plague. Susan receives a letter from her own government, asking her to report for duty immediately. However, the plague also starts to spread in the village she is working.

	Definitely YES	Strongly YES	Moderately YES	Can't decide	Moderately NO	Strongly NO	Definitely NO
X_1							
X_2							
X_3							
X_4							
X_5							
X_6							

1^{st} choice to give up the present job _____

2^{nd} choice _____

3^{rd} choice _____

A Doctor's Dilemma

art II:

mportance:

ery reat	Great	Some	Little	No	
					1. Is it a pity to give up a well-paid and high status job and work for some strangers in another country ?
					2. Is there a duty for Susan to work for people in her own country since she has been educated by her country ?
					3. Should we help others only when we are safe and rich or do so because we value and care about them as much as our own people ?
					4. For X_1 only: Whether life is still meaningful without being married to someone you love.
					5. For X_2 only: Isn't it heartless to forsake her mother who needs her care ?
					6. For X_4 only: Is Susan willing to risk being attacked so as to continue her work there ?
					7. For X_5 only: Whether the headman has a legal right to force Susan to leave his country or not.
					8. Whether Susan can work more effectively and productively in her own country or in an underdeveloped country.
					9. Would a gifted person's help to poor and unlucky people in another country bring more good to the world ?

Put your top three statements in order of importance:

Most important _____ 2nd most important _____ 3rd most important _____

Car Accident

Suppose one day you are on a bus which is in an accident with a car and a heavy lorry carrying dangerous chemicals. Most of the passengers on the bus are injured and it looks as if some might be dead. Fortunately, you are uninjured. You can see flames start to come from under the car and the lorry and you must get away as quickly as possible. However, you feel that you are strong enough to help to move one person to safety and so you start to drag a stranger near you off the bus. Just as you leave the bus with the stranger, you hear someone (X) in the car crying out for help. But you have only time to rescue one person, would you rescue X instead of the stranger from the bus if you recognise X as _____?

Part I:

	Definitely YES	Strongly YES	Moderately YES	Can't decide	Moderately NO	Strongly NO	Definitely NO	X:
X_1								X_1 = your father or mother.
X_2								X_2 = a postman.
X_3								X_3 = another stranger.
X_4								X_4 = a blind person.
X_5								X_5 = someone you dislike or an enemy.
X_6								X_6 = your best friend.
X_7								X_7 = a medical doctor who is on call for an emergency case.
X_8								X_8 = a famous filmstar.
X_9								X_9 = a famous scientist who is also a Nobel prize winner.

Select the top FOUR choices and put them in order:

1st choice	2nd choice	3rd choice	4th choice
_____	_____	_____	_____

Car Accident

Part II

IMPORTANCE:

Very Great	Great	Some	Little	No	
					1. Whether the common belief that one should try one's best to love, protect and please one's parents applies in this case.
					2. To what extent the person X would benefit me.
					3. Whether the stranger from the bus has the right to be rescued, regardless of who X is in this case.
					4. Would the rescue of a particular person's life bring more good to the society ?
					5. Is it heartless to rescue a stranger instead of one's parents or relatives ?
					6. Do I have the right to rescue only those I like ?
					7. Does the belief that everyone's life is as equally important as others apply in this case ?
					8. Do I choose to rescue X or not by a belief based on the equality of the basic rights of everyone ?
					9. What my personal relationship is with X.

Put your top three statements in order of importance:

Most important _____ 2nd most important _____ 3rd most important _____

The Criminal

In all of the following situations, you observed quite by chance a person X committing a crime. You also saw where X went afterwards and so you know where X has hidden himself or herself.

Would you report X to the police if X is _____ ?

Situation 1:

X was robbing a bank at gunpoint for some unknown reasons to you.

	Definitely YES	Strongly YES	Moderately YES	Can't decide	Moderately NO	Strongly NO	Definitely NO	X:
X_1								X_1 = someone you are acquainted with.
X_2								X_2 = your best friend.
X_3								X_3 = your brother or sister.
X_4								X_4 = a stranger.

Situation 2:

X was robbing a bank at gunpoint for some unknown reasons to you, and suppose you were a police officer.

	Definitely YES	Strongly YES	Moderately YES	Can't decide	Moderately NO	Strongly NO	Definitely NO	X:
X_5								X_5 = someone you are acquainted with.
X_6								X_6 = your best friend.
X_7								X_7 = your brother or sister.
X_8								X_8 = a stranger.

***In the following three situations, DO NOT suppose you were a police officer.

Situation 3:

X was robbing a bank at gunpoint because his or her son has a rare disease and is near death. The doctors think the son may be cured only in a particular hospital in another country and the cost is about £10,000. There is no other way for X to get such a large amount of money except by robbery.

	Definitely YES	Strongly YES	Moderately YES	Can't decide	Moderately ND	Strongly NO	Definitely NO	X:
X_9								X_9 = someone you are acquainted with
X_{10}								X_{10} = your best friend.
X_{11}								X_{11} = your brother or sister.
X_{12}								X_{12} = a stranger.

The Criminal

Part I (CONT'D):

Situation 4:

Suppose it is you who have the rare disease in the above case (i.e. Situation 3) and X was robbing the bank in order to get money so that you could be cured. There is no other way for you to get such a large amount of money.

	Definitely YES	Strongly YES	Moderately YES	Can't decide	Moderately NO	Strongly NO	Definitely NO	X:
X_{13}								X_{13} = someone you are acquainted with.
X_{14}								X_{14} = your best friend.
X_{15}								X_{15} = your brother or sister.

Situation 5:

There was an earthquake in the northern part of your country a few days ago. The government has been very inefficient in taking care of the people in the disaster area, and only a few rich people have offered financial help. X went to the area and found that thousands of people urgently needed food, medicine and social care. He/She felt so desperate about the situation that he/she went back and robbed a bank at gunpoint in the Southern part in order to get money to buy food and medicine for the people in the disaster area.

	Definitely YES	Strongly YES	Moderately YES	Can't decide	Moderately NO	Strongly NO	Definitely NO	X:
X_{16}								X_{16} = someone you are acquainted with.
X_{17}								X_{17} = your best friend.
X_{18}								X_{18} = your brother or sister.
X_{19}								X_{19} = a stranger.

In the situations described above, your best friend has been robbing a bank.
To what extent would you report your best friend to the police in those situations?

X_2 = your best friend in Situation 1 (Reminders: reasons not known to you)

X_6 = your best friend in Situation 2 (you are a police officer)

X_{10} = your best friend in Situation 3 (cure the son's disease)

X_{14} = your best friend in Situation 4 (cure your disease)

X_{17} = your best friend in Situation 5 (earthquake victims)

Arrange the above FIVE choices (i.e. X_2 , X_6 , X_{10} , X_{14} and X_{17}) in the order that you would report your best friend to the police:

1st choice to report X ____ 2nd ____ 3rd ____ 4th ____ 5th ____

The Criminal

Part II:

IMPORTANCE

Very Great	Great	Some	Little	No	
					1. Is it a citizen's duty to report X to the police regardless of the situations ?
					2. Whether the gun X used is a real one or not.
					3. Isn't it too cruel to report one's brother or sister to the police ?
					4. Could I justify consistently my decision to report X or not according to my moral beliefs ?
					5. Whether allowing X not to be arrested is fair to other criminals or not.
					6. For Situation 2 only: Am I willing to risk being punished severely by the law if I do not report X ?
					7. For Situation 3 only: Is it the society's duty to meet the basic claims (e.g. survival) of everyone in a just way ?
					8. For Situation 4 only: Isn't it coldhearted to report a person who robbed for me ?
					9. For Situation 5 only: Can society allow people to rob for a good cause and still protect the majority of the people ?

Put your top three statements in order of importance:

Most important _____ 2nd most important _____ 3rd most important _____

Appendix 5(A) (ii) MDT Form B

Directions

A number of social situations are given below. Each of the situations is followed by a set of questions to see what opinions you have. There are no "right" or "wrong" answers because everyone has the right to his or her own views.
Please answer all the questions as this is important when comparing different people's opinions.
Your answers are quite confidential.
Please provide us the following information:

Country of origin: _____

Name: _____ Age: _____ Years _____ Months. Sex: _____.

In the following paragraphs the instructions for answering the questionnaire are presented on one side with an example shown on the other side.

Instructions

Please read the paragraph carefully. Each paragraph is followed by a set of questions. The questions are divided into two parts: I and II.

Part I:

. Please tick the appropriate boxes to indicate your choices.
This example shows how someone has answered the sample question.

. In this example, the most definite choice was Arts, then Social Science. Either Medicine or Science came next, with Engineering and Music/ Fine Art not preferred.

. When you have filled in the grid, decide on the order in which you would place your top three choices and arrange them in order.

. In this case, it was easy to place X_2, then X_1 in order, but a decision had to be made between Medicine and Science as these were both ticked in the same column. Here Science (i.e. X_5) was chosen.

Example

Suppose you were asked to choose a subject (X) to study in a university. Would you choose X if X is _____ ?

Part I:

X: X_1 = Social Science (e.g. economics, sociology, psychology)
X_2 = Arts (e.g. history, languages, literature)
X_3 = Music or fine Art
X_4 = Medicine
X_5 = Science (e.g. Physics, Chemistry)
X_6 = Engineering

	Definitely YES	Strongly YES	Moderately YES	Can't decide	Moderately NO	Strongly NO	Definitely NO
X_1		✓					
X_2	✓						
X_3							✓
X_4			✓				
X_5			✓				
X_6						✓	

Select the top three choices and put them in order:

1st choice	2nd choice	3rd choice
X_2	X_1	X_5

*H.K. Ma, 5/1981.

Instructions

Part II:

1. You are asked to say, in your opinion, how important each of the following statements would be in deciding your answers in Part I.

2. If you are not certain of the meaning of a statement, or the statement sounds nonsense, mark it as "no importance".
For example, in Statement 6, if you do not know who Albert Einstein was, or you think that the content of this statement is irrelevant to your answers in Part I, mark it as "no importance".

3. Some statements in Part II are concerned with a particular choice X in Part I.
For example, the Statement 6 here is mainly concerned with the choice X_5 in Part I.

4. Please note that your choice of the three most important statements should be consistent with your ratings given in the grid.

Example

Part II:

IMPORTANCE:

Very Great	Great	Some	Little	No	
		✓			1. Whether my parents agree with my choice.
✓					2. Whether I feel I could do my best in a particular course.
			✓		3. Whether some particular subjects are more difficult than others.
✓					4. Could I get a good job after finishing a particular course ?
			✓		5. Whether some of my friends are keen to do the same course.
				✓	6. For X_5 only: Whether Albert Einstein is known to have been a great physicist or not.

Put your top three statements in order of importance:

Most important	2nd most important	3rd most important
2	4	1

Finally,

1. In Part I, please give the first answer that comes into your mind.
2. In each of the following situations, please answer the Part I questions before doing the Part II ones.

THANK YOU VERY MUCH FOR FILLING IN THE QUESTIONNAIRE
YOUR REPLIES WILL BE VERY HELPFUL TO US.

The Young Robber

Suppose one day you are walking in a deserted and poor area of a big city when you see a robbery taking place. A young man is pointing a knife at someone (X) and is obviously demanding the victim's money. There are no other people around. Would you attempt to help X by rushing at the robber if you recognize X to be _____ ?

Part I:

	Definitely YES	Strongly YES	Moderately YES	Can't decide	Moderately NO	Strongly NO	Definitely NO	X:
X_1								X_1 = a young stranger, 20 years old.
X_2								X_2 = an old stranger, 70 years old.
X_3								X_3 = your brother or sister.
X_4								X_4 = your best friend.
X_5								X_5 = a famous scientist who is also a Nobel prize winner.
X_6								X_6 = someone you dislike or an enemy.
X_7								X_7 = a porter.
X_8								X_8 = your husband/wife*.

*Ignore this item if it doesn't apply to you.

Select the top three choices and put them in order:

1st choice _____ 2nd choice _____ 3rd choice _____

The Young Robber

Part II:

IMPORTANCE:

Very Great	Great	Some	Little	No	
					1. Isn't it cruel-hearted for a young man to rob an old stranger of 70 ?
					2. How could one be so heartless not to help someone who is helpless ?
					3. Whether allowing the young man to rob the victim in this case would encourage more robberies or not.
					4. Whether the young man understands how destructive his act of robbing is to society.
					5. Could the basic rights of everyone be well protected if people in this case do not help the victim ?
					6. Would I become a hero by rescuing the victim ?
					7. Does helping the victim by fighting the robber reflect the general will of society ?
					8. Is it a citizen's duty to help those who are being robbed ?
					9. Do I have any right to protect myself instead of risking my life by fighting the robber in this case ?

Put your top three statements in order of importance:

Most important _____ 2nd most important _____ 3rd most important _____

Freedom of Speech

Mr. Young is a citizen of a certain country ruled by a cruel dictator. He does not like the way in which the people are oppressed and he constantly speaks out against the harshness of the government. Mr. Young has been warned to stop expressing his opinions and he has already suffered in some way X. Mr. Young has now received further warnings that a more severe punishment than that already experienced would be inflicted on him if he continued to express his opinions. Suppose you were Mr. Young, would you stop expressing your opinions if X is _____?

Part I:

X: X_1 = Mr. Young has already been harassed and injured physically so that his legs have become paralysed.

X_2 = a so-called "accident" had happened to Mr. Young's car in which his mother and one of his sons were killed.

X_3 = rumours were spread against Mr. Young so that people no longer respect and trust him.

X_4 = most of Mr. Young's property was confiscated by the government.

X_5 = Mr. Young had been exiled from the country for 15 years. He has just returned to his home and family.

X_6 = Mr. Young has already spent 10 years in a prison camp and has only recently been released.

	Definitely YES	Strongly YES	Moderately YES	Can't decide	Moderately NO	Strongly NO	Definitely NO
X_1							
X_2							
X_3							
X_4							
X_5							
X_6							

Select the top three choices and put the numbers in order:

1^{st} choice	2^{nd} choice	3^{rd} choice
_____	_____	_____

Freedom of Speech

Part II:

IMPORTANCE:

Very Great	Great	Some	Little	No	
					1. Can law and order be maintained if everyone is allowed to speak freely on public affairs ?
					2. Whether the dictator would soon be assassinated or not.
					3. Is Mr. Young's act of speaking freely motivated by a good will and rationalized on a principle above the law ?
					4. Does the government have the right to stop Mr. Young from speaking freely on public affairs ?
					5. Would allowing Mr. Young to speak freely benefit the majority of people in the long run ?
					6. For X_1 only: Is Mr. Young willing to risk being harmed physically or even being shot so as to continue speaking out ?
					7. For X_2 only: Is it a selfish act to ignore the family's security by pursuing one's own goal ?
					8. For X_3 only: Is it terrible and meaningless to live without being respected and trusted by friends and others ?
					9. Is the right to speak freely on public affairs one of the basic rights that every individual should justly have ?

Put your top three statements in order of importance:

Most important _____ 2^{nd} most important _____ 3^{rd} most important _____

Car Accident

Suppose one day you are on a bus which is in an accident with a car and a heavy lorry carrying dangerous chemicals. Most of the passengers on the bus are injured and it looks as if some might be dead. Fortunately, you are uninjured. You can see flames start to come from under the car and the lorry and you must get away as quickly as possible. However, you feel that you are strong enough to help to move one person to safety and so you start to drag a stranger near you off the bus. Just as you leave the bus with the stranger, you hear someone (X) in the car crying out for help. But you have only time to rescue one person, would you rescue X instead of the stranger from the bus if you recognise X as _____?

Part I:

	Definitely YES	Strongly YES	Moderately YES	Can't decide	Moderately NO	Strongly NO	Definitely NO	X:
X_1								X_1 = your father or mother.
X_2								X_2 = a postman.
X_3								X_3 = another stranger.
X_4								X_4 = a blind person.
X_5								X_5 = someone you dislike or an enemy.
X_6								X_6 = your best friend.
X_7								X_7 = a medical doctor who is on call for an emergency case.
X_8								X_8 = a famous filmstar.
X_9								X_9 = a famous scientist who is also a Nobel prize winner.

Select the top FOUR choices and put them in order:

1^{st} choice	2^{nd} choice	3^{rd} choice	4^{th} choice
_____	_____	_____	_____

Car Accident

Part II

IMPORTANCE:

Very Great	Great	Some	Little	No	
					1. Whether the common belief that one should try one's best to love, protect and please one's parents applies in this case.
					2. To what extent the person X would benefit me.
					3. Whether the stranger from the bus has the right to be rescued, regardless of who X is in this case.
					4. Would the rescue of a particular person's life bring more good to the society ?
					5. Is it heartless to rescue a stranger instead of one's parents or relatives ?
					6. Do I have the right to rescue only those I like ?
					7. Does the belief that everyone's life is as equally important as others apply in this case ?
					8. Do I choose to rescue X or not by a belief based on the equality of the basic rights of everyone ?
					9. What my personal relationship is with X.

Put your top three statements in order of importance:

Most important _____ 2nd most important _____ 3rd most important _____

Bank Robbery

Suppose one day, just as you were walking along a street, a bank robbery was taking place. Policemen were chasing several robbers who started to fire guns. You stepped back into a shop doorway to get some cover. One of the robbers dropped a bag of money as he ran away. You saw a person X quickly picked up the bag and both of you realized that you were the only person who had noticed this action. X ran up to you to hide himself and also begged you not to reveal that he had picked up the bag. He said that he needed the money to send his daughter to a hospital in another country for urgent special medical treatment otherwise she would die soon. He said that all his other efforts to get the money required had been unsuccessful.

Suppose you either knew or were convinced that what you were told was true, would you tell the police that X had the missing bag of money if X is _____ ?

Part I:

	Definitely YES	Strongly YES	Moderately YES	Can't decide	Moderately NO	Strongly NO	Definitely NO	X:
X_1								X_1 = your brother.
X_2								X_2 = your best friend.
X_3								X_3 = someone you are acquainted with
X_4								X_4 = a stranger.

(Please answer X_1 to X_4 before continuing.)

Suppose in the above case, one of the robbers also discovered that X had picked up the bag of money and fired at him. Unfortunately, one of the bullets went into your leg and X was not injured at all. While waiting for an ambulance X told you his story, then he ran off. The bullet had shattered your thigh so badly that your leg had to be amputated, and if this had not been done your life would have been in danger. Now you have only one leg and quite by chance you discover where X has hidden himself. Would you report X to the police if X is _____ ?

	Definitely YES	Strongly YES	Moderately YES	Can't decide	Moderately NO	Strongly NO	Definitely NO	
X_5								X_5 = your brother.
X_6								X_6 = your best friend.
X_7								X_7 = someone you are acquainted with.
X_8								X_8 = a stranger.

Select the top three choices from X_1 to X_8 and put them in order:

1st choice to report X _____ 2nd choice _____ 3rd choice _____

Bank Robbery

Part II:

IMPORTANCE:

Very Great	Great	Some	Little	No	
					1. Is it a pity to let the daughter of X die without getting the special medical treatment ?
					2. Whether allowing X to be free of legal prosecution is fair to other suspected thieves and robbers.
					3. Whether the right to life is more important than the right to own property in this case ?
					4. Is it a citizen's duty to report X to the police regardless of X's intention ?
					5. Whether reporting X to the police benefits the society or protect anybody.
					6. For X_5 to X_8 only: Whether X should be blamed for the loss of my leg.
					7. For X_5 to X_8 only: Is it possible to get some compensation or reward for the loss of my leg by reporting X to the police ?
					8. For X_5 to X_8 only: Whether my leg is more valuable than all the money in the bag taken by X.
					9. Does everyone in the society have equal and similar rights to both life and property ?

Put your top three statements in order of importance:

Most important _____ 2^{nd} most important _____ 3^{rd} most important _____

Civil War

During a civil war in a certain country, thousands of people living there were dying of hunger every day. Mr. A is a peasant living in a village in that country. He is about 45 years old and his wife is 40. They have six children, the eldest is a beautiful daughter of 18 and the youngest is a baby of two months. Because of the civil war and a recent flood, Mr. A's village has become a disaster area. More than half of the people in the village have already died of starvation. Mr. A's parents and two of his children were among them. Mr. A and the rest of his family have been surviving by eating bark for some days. Now Mr. A's wife and the baby are near death and Mr. A feels very desperate and considers to do something X.

Suppose you were Mr. A, would you do X if X is _____ ?

Part I:

X: X_1 = to force his eldest daughter to marry a rich old man in the city in order to get food and money from the rich man.

X_2 = to do nothing but to continue to search for more bark for his family. In so doing, he is certain that his wife and the baby are going to die in two or three days' time.

X_3 = to sign a 5-year contract to work for an oversea mining company, leaving his family behind. This job means food and money for his family, but is slavery.

X_4 = to commit suicide.

X_5 = to rob others' food for his family.

X_6 = to leave and completely forsake his family.. He will then survive himself by robbery or other means.

	Definitely YES	Strongly YES	Moderately YES	Can't decide	Moderately NO	Strongly NO	Definitely NO
X_1							
X_2							
X_3							
X_4							
X_5							
X_6							

Select the top three choices and put them in order:

1st choice _____ 2nd choice _____ 3rd choice _____

Civil War

Part II:

IMPORTANCE:

Very Great	Great	Some	Little	No	
					1. For X_1 only: Does Mr. A's daughter have a right to refuse to marry any person she dislikes ?
					2. For X_1 only: Whether Mr. A's daughter is a very beautiful and charming girl.
					3. For X_2 only: Does Mr. A consider carefully on an equal basis the rights and claims of everyone, including himself, in this case ?
					4. For X_3 only: Is Mr. A willing to risk being injured or even killed in the mining work so as to get food for his family ?
					5. For X_4 only: Does Mr. A himself alone have the absolute right to determine whether he is going to live or not ?
					6. For X_5 only: Could social order be maintained if those who are starving in this case are not stopped from robbing others' (even the rich people's) food ?
					7. For X_5 only: Is it too cruel to rob other people's food in this case ?
					8. For X_6 only: Is it heartless for Mr. A to forsake his family in this desperate situation ?
					9. For X_6 only: Whether the right to survive oneself supersedes the moral responsibility that a husband or a father should normally uphold.

Put your top three statements in order of importance:

Most important _____ 2^{nd} most important _____ 3^{rd} most important _____

Appendix 5(A) (iii) Civil War (Long Version)

Civil War

During a civil war in a certain country, thousands of people living there were dying of hunger every day. Mr. A is a peasant living in a village in that country. He is about 45 years old and his wife is 40. They have six children, the eldest is a beautiful daughter of 18 and the youngest is a baby of two months. Because of the civil war and a recent flood, Mr. A's village has become a disaster area. More than half of the people in the village have already died of starvation. Mr. A's parents and two of his children were among them. Mr. A and the rest of his family have been surviving by eating bark for some days. Now Mr. A's wife and the baby are near death and Mr. A feels very desperate and considers to do something X.

Suppose you were Mr. A, would you do X if X is _____ ?

Part I:

X: X_1 = to force his eldest daughter to marry a rich old man in the city in order to get food and money from the rich man.

X_2 = to do nothing but to continue to search for more bark for his family. In so doing, he is certain that his wife and the baby are going to die in two or three days' time.

X_3 = to sign a 5-year contract to work for an oversea mining company, leaving his family behind. This job means food and money for his family, but is slavery.

X_4 = to commit suicide.

X_5 = to rob others' food for his family.

X_6 = to leave and completely forsake his family. He will then survive himself by robbery or other means.

X_7 = to exchange the corpses of his two children with other people's dead children and eat the exchanged corpses with his family.

	Definitely YES	Strongly YES	Moderately YES	Can't decide	Moderately NO	Strongly NO	Definitely NO
X_1							
X_2							
X_3							
X_4							
X_5							
X_6							
X_7							

Select the top three choices and put them in order:

1st choice _____ 2nd choice _____ 3rd choice _____

Civil War

Part II:

IMPORTANCE:

Very Great	Great	Some	Little	No		
					1. Does Mr. A's daughter have a right to refuse to marry any person she dislikes ?	For X_1
					2. Whether Mr. A's daughter is a very beautiful and charming girl.	
					3. Would forcing his daughter to marry a man she dislikes bring benefits for more people in Mr. A's case ?	
					4. Does Mr. A consider carefully on an equal basis the rights and claims of everyone, including himself, in this case ?	For X_2
					5. Is society possible if parents do not undertake the responsibility of looking after their children even by sacrificing their own happiness ?	For X_3
					6. Is Mr. A willing to risk being injured or even killed in the mining work so as to get food for his family ?	
					7. Does Mr. A himself alone have the absolute right to determine whether he is going to live or not ?	For X_4
					8. Is it against law for a person to commit suicide ?	
					9. Could social order be maintained if those who are starving in this case are not stopped from robbing others' (even the rich people's) food ?	For X_5
					10. Is it too cruel to rob other people's food in this case ?	
					11. Is it heartless for Mr. A to forsake his family in this desperate situation ?	For X_6
					12. Whether the right to survive oneself supersedes the moral responsibility that a husband or a father should normally uphold ?	
					13. Isn't it inhuman to eat human flesh ?	For X_7
					14. Whether Mr. A thinks that eating human flesh in this case is a forgivable and acceptable act ?	
					15. Whether the law of society should be upheld during war time or disastrous circumstances such as famine and earthquakes.	

Put your top FIVE statements in order of importance:

Most important _____ 2nd most important _____ 3rd most important _____ 4th most important _____ 5th most important _____

APPENDIX 5(B) Differences Between MDT Forms A(IS) and A

	Form A(IS)	Form A
A Lost Bag	Part II:	
	3. Whether the Commandment "Thou shalt not steal" applies in this case	3. Whether the common belief that "we should not steel" applies in this case.
	4. For X_2 and X_3 only: Should one uphold the law of the society by all means, even to lose one's life?	4. For X_2 and X_3 only: Whether the right to survive is more important than the social responsibility that a citizen should normally show in this case.
The Sinking Boat	Part I:	
	X_9=Someone from another country	X_9=your husband/wife or own child.* (*Ignore this item if it does not apply to you)
	Part II:	
	2.Whether I am obligated by a law to sacrifice for X.	2.Is it my responsibility to sacrifice myself for X.
	5.Whether life is so precious that it should be protected by all means.	5.Should everyone try his/her very best to protect life by all means?

	Form A(IS)	Form A
A Doctor's Dilemma	Part II:	
	1.Is it a pity to give up a well-paid and high status job and work for some strangers thousands of miles away from one's home?**	1.Is it a pity to give up a well-paid and high status job and work for some strangers in another country?**
Car Accident	Part I:	
	X_2=a highly respected religious leader.	X_2=a post man
	X_4=a blind man/woman.	X_4=a blind person***
	X_{10}=a postman	no X_{10}
	Part II:	
	6.Am I allowed by law to rescue only those I like?	6.Do I have the right to rescue only those I like?

** and ***: These two pairs of item responses are regarded as equivalent in the data analysis.

Appendix 5(C) MDT Form A(5): Chinese Version

姓名：_____

年齡 _____ 性別：_____ 級別：_____

本問卷包括數個社會問題，其目的在於探討人們對於這些問題之意見。每個人的意見都是值得尊重的，所以下列問題的答案是沒有所謂正確答案的。

請回答所有的問題，以便研究者在比較各人的答案時有完整的資料。

你答題結果及所提供的個人資料，只供研究參考之用。

在下列文字中，左面乃答題指示，右面則為一範例。（請沿箭咀所示的方向閱讀。）

答題指示

請細心閱讀每一段敘述社會問題的短文，每一段短文後都有一組題目，該組題目共分兩部份。

第一部份：

1. 請在適當的空位劃上一「✓」符號，以表示你對該問題的回答。右面的範例展示其作答的方式。

2. 在此範例中，最肯定的選擇是文科，其次是社會科學、醫科及理科，又其次而工科及音樂或美術則為最不感興趣的課程。

範例

假如要你在一間大學選一課程(X)來修讀，如果X是下列的課程，你會選修X嗎？

第一部份

X：X_1 = 社會科學(例如：經濟學，社會學，心理學)
X_2 = 文科(例如：歷史，語文學，文學)
X_3 = 音樂或美術　X_4 = 醫科
X_5 = 理科(例如：物理學，化學)
X_6 = 工科

	一定會	多數會	可能會	不能決定	可能不會	多數會	一定不會
X_1		✓					
X_2	✓						
X_3							✓
X_4			✓				
X_5			✓				
X_6						✓	

3 當你答完上列一組問題時，請將你的頭三個選擇，依次序排列。

→ 將頭三個選擇，依次序排列：

第一選擇	第二選擇	第三選擇
x_2	x_1	x_5

4 在此一範例中，第一和第二選擇很明顯地為 x_2 及 x_1。然而由於 x_4（醫科）和 x_5（理科）同為「可能會」的選擇，答卷者需加以考慮，從 x_4 及 x_5 中選擇出一個作為第三選擇。在此範例中，x_5 被選為第三選擇。

第二部份

1. 在決定第一部份問題的答案時，下列的一組問題（或理由）的重要程度為何。

第二部份

非常重要	很重要	頗重要	不大重要	毫不重要	
		✓			1. 我的父母是否同意我的選擇
✓					2. 我是否認為我喜歡於修讀某一科？
			✓		3. 是否有些課程比較要他的難讀？
✓					4. 修畢某一學科是否能找到一份好工作？
			✓		5. 我的好友們是否都熱衷於修讀同一課程？
				✓	6. 只適用於 x_5：愛因斯坦是否是一個偉大的物理學家？

2. 假如你了明白某一問題（或理由）的意思為何，又或認為問題實屬無稽，則應在「毫不重要」欄劃上一「✓」符號。例如：在問題(6)中，如果你不知道愛因斯坦為何人，又或認為該問題與第一部分的答案無任何關連，則應在「毫不重要」欄劃上一「✓」符號。

3 在第二部分中，有些問題只和第一部分的某一 X 有較重要的關係
例如：在範例中的問題(6)只和第一部分的 X_5 (理科)有較重要的關係。

→ 將最重要的三個問題，依次序順列：

第一重要	第二重要	第三重要
2	4	1

4 請注意你所選的最重要三個問題應與上面方格內所示的答案相符，不要產生矛盾。

最後 請留意下列兩要點：

1. 作答第一部分時，請將即時想到的第一個答案寫下。
2. 作答每一社會問題時，請做完第一部分的問題才作答第二部分的

~ 本問卷之研究工作者，十分多謝你的幫忙和合作 ~

一個遺失的錢袋

假設有一天，當你獨自在一條街道上行走時，你偶然發現地上有一個袋，你打開它看發現內裏裝着很多鈔票，大概有十萬元。袋內也有些文件，顯示這些錢是屬於某一間大商行的，十分湊巧地，由於某一種原因(X)，你急需要一大筆現款，除了動用這袋內的金錢外，你別無他法等得所需的現款，你會否動用袋內的錢，如果你需要大量金錢的原因X為__？

第一部分：

X：X_1 = 外國一間國際著名的大學剛錄取你修讀一個二年課程，你極之渴望能前往該大學渴學，但卻申請不到任何獎助學金，而每年學雜費約需五萬元。

X_2 = 你不幸患上一種罕有的絕症，正面臨死亡的威脅，醫生認為如能前往外國某一間醫院治療，可望痊癒，但所需的費用約為十萬元。

X_3 = 假如在上列情況中患上絕症的是你的先爭妹妹中一人。

X_4 = 你從商數年，近兩年間欠下銀行十萬元，最近，由於沒法依期付給銀行利息，銀行的經理要求你於兩星期內清還全部借款，否則將會依法控告你。

X_5 = 假如在X_4中，不是你，而是你的最好朋友因做生意而欠下銀行十萬元，前些時，你曾答應你的朋友在他有困難時將全力幫忙他，現在你的朋友要求你設法借他十萬元

X_6 = 你想買一輛豪華房車

	一定會	多數會	可能會	不能決定	可能不會	多數不會	一定不會
X_1							
X_2							
X_3							
X_4							
X_5							
X_6							

將頭三個選擇依次序排列：

第一選擇 _____　第二選擇 _____　第三選擇 _____

第二部分　　一個遺失的錢袋

非常重要	很重要	頗重要	不大重要	毫不重要	
					1. 我被警察捉到的可能性是否很大？
					2. 將拾得的錢袋交給警方是否是每一個市民的責任？
					3.「不應偷竊他人財物」的一般道理在此情況下是否適用。
					4. 只適用於 x_2 及 x_3：在此情況下，生存的權利是否比一個市民應負的社會責任更重要？
					5. 只適用於 x_2 及 x_3：社會是否不曾盡力提供我（或我的兄弟姊妹）對於個人生存所希望得到的合理照顧？
					6. 只適用於 x_2 及 x_3：我的朋友或其他人是否會原諒我將錢中的錢用來醫病？
					7. 只適用於 x_5：為了遵守諾言是否應該做出違法的事？
					8. 只適用於 x_6，竭盡所能去使自己得到快樂不是一件最自然的事嗎？
					9. 該錢袋所屬的商行是否已為袋中的錢購買了保險。

最
將重要的三個問題，依次序排列：

第一重要　　第二重要　　第三重要

_____　　_____　　_____

沉船

你和X同在一艘快將沉沒的船中，但你或X，只有一人可被救，你會否犧牲自己而使X得救如果X是 ___？

第一部分

	一定會	多數會	可能會	不能決定	可能不會	多數不會	一定不會	X：
X_1								X_1 = 一個20歲的陌生人
X_2								X_2 = 一個九歲的陌生人
X_3								X_3 = 一個著名的科學家曾經獲諾貝爾獎
X_4								X_4 = 你的兄弟或姊妹
X_5								X_5 = 你的最好朋友
X_6								X_6 = 一個孕婦
X_7								X_7 = 一個你不喜歡的人或一個敵人
X_8								X_8 = 一個六歲大的小孩子
X_9								X_9 = 你的丈夫或妻子或兒子*

*：如不適用於你，無需作答此項

將頭四個選擇依次序排列：

第一選擇　第二選擇　第三選擇　第四選擇

___　___　___　___

第二部分

況般

非常重要	很重要	頗重要	不大重要	毫不重要	
					1. 我是否願意忍受溺斃之可怕和痛苦經驗從而使X脫救。
					2. 我是否有責任為X而犧牲自己的性命。
					3. 眼看X並去而自己得救是否是一無恥惡心的行為。
					4. 我對人與人之間互相交往所應把持的態度和價值觀念為何？
					5. 每一個人是否都應盡一切力量去保護生命？
					6. X是否願意讓我犧牲而令自己得救，這個選擇的權利是否應受到尊重？
					7. 在危難的時候，一個人照顧其親朋底反是否乃一最自然不過的事？
					8. 每個人是否都應有決定他願意或不願意為別人犧牲自己的性命的權利？
					9. 一般宗教信仰(例如：基督教或佛教)中的我們應愛別人，並在必要時為他人作出犧牲的道理是否適用於此情況？

將最重要的三個問題依次序排列：

第一重要 _____ 第二重要 _____ 第三重要 _____

一個醫生的難題

陳秀玉是一個年輕的女醫生，她在一間擁有很多富有病人的私家醫院中工作，薪酬十分豐厚，她已和院中的李國明醫生訂了婚。

但是，在過往的數年工作中，陳秀玉一點也不快樂，最後她決定前往一個十分落後的國家當五年義務醫生，她的父母，李國明及其他朋友一致反對她這一決定，然而她克服了一切困難，到一個落後國家中的一條貧窮的鄉村中行醫，她是村中唯一的醫生。陳秀玉對於這工作感到十分滿意，而那裏的村民對她又尊重又愛戴。在那鄉村中工作兩年後，陳秀玉面臨一個難題(X)，此難題是關係到她應否繼續留在該鄉村行醫抑或立即回到自己的國家去。假如你是陳秀玉，你會否放棄鄉村的行醫工作而回國如果那個難題X是___？

第一部分

X：X_1 = 她的未婚夫李國明來信告訴她說他不願再等下去，倘若她不於數月內回來，他則只有撕毀婚約。

X_2 = 她的母親因中風而致下半身癱瘓，她要求秀玉回來照顧她。

X_3 = 由於經濟衰退，經常提供藥物及儀器給秀玉的診所的慈善機構今年將無法再提供藥物給她，唯一能使診所正常服務的方法是向她的朋友借大量金錢購買藥物。

X_4 = 她工作的國家發生內亂，現在還有恐怖分子藏身於叢林中，並襲擊周圍的村莊，秀玉的鄉村及她的診所已被襲擊兩次，幸而她不曾受傷害，現在她的鄉村處於經常被襲擊的威脅。

X_5 = 她搶救村長的兒子的性命失敗，村長遷怒於她，強迫她立即離開該國，繼續留下的唯一方法乃組織村民支持她，不過此法不易行。

X_6 = 很多國家，其中包括秀玉自己的國家，發生瘟疫，秀玉接到自己國家的醫務處的一封信，要她立即回國參加搶救工作，但是秀玉所工作的鄉村中也正發生瘟疫。

	一定會	多數會	可能會	不能決定	可能不會	多數不會	一定不會
X_1							
X_2							
X_3							
X_4							
X_5							
X_6							

將頭三個選擇依次序排列：

第一選擇（放棄鄉村的行醫工作）　　第二選擇 ______　　第三選擇 ______

第二部分　　一個醫生的難題

非常重要	很重要	頗重要	不大重要	毫不重要	
					1. 放棄俸薪厚職而到別國去為一些陌生人工作是否一件十分可惜的事？
					2. 泰王是由她的國家培養出來的，她是否有責任報她的國家的人民服務？
					3. 是否只有當我們富有及出定時，我們才應幫助別國的人，抑或是他們是因為我們重視及關心他們如自己的同胞一樣？
					4. 只適用於 X_1：不和自己深愛的人結合生命是否仍有意義？
					5. 只適用於 X_2，抛棄需要自己照顧的母親是否太過沒有良心？
					6. 只適用於 X_4，泰王是否自問恐怖分子襲擊之險而繼續留在鄉村中行醫？
					7. 只適用於 X_5，村長是否有法定權力去強迫泰王離去？
					8. 泰王留在自己的國家中工作是否比在一個落後的國家工作更能有效地發揮她的才能，作成更大的貢獻？
					9. 一個有才能的人去為別國的貧窮及不幸的人服務是否會帶來世上更多的和平？

將最重要的三個問題依次排列。

第一重要　　第二重要　　第三重要

_____　　_____　　_____

車禍

假設有一天你乘坐的一輛巴士與一輛私家車及一架滿載危險化學品的大貨車相撞，巴士上大部分的乘客都因而受傷，其中有些可能已死亡，你卻幸而沒有受傷。你看見火焰從私家車和大貨車中噴出，你知道必須盡快離開，然而你覺得自己還有能力將一個受傷的乘客拖去安全的地方。於是你就將身邊的一個陌生人拖出巴士，當你和那陌生人剛離開巴士時，你就聽見失事的私家車上有一個人(X)大聲呼救，但你只夠時間去救一個人，你會否救X而不救巴士上的陌生人，如果你認出X是____？

第一部分：

	一定會	多數會	可能會	不能決定	可能不會	多數不會	一定不會	X：
X_1								X_1 = 你的父親或母親
X_2								X_2 = 一個郵差
X_3								X_3 = 另一個陌生人
X_4								X_4 = 一個盲人
X_5								X_5 = 一個你不喜歡的人或敵人
X_6								X_6 = 你的最好朋友
X_7								X_7 = 一個應急診的醫生
X_8								X_8 = 一個著名的電影名星
X_9								X_9 = 一個著名科學家曾得諾貝爾獎

將頭四個選擇依次序排列：

第一選擇　第二選擇　第三選擇　第四選擇

_____　_____　_____　_____

第二部分　　車禍

非常重要	很重要	頗重要	不大重要	毫不重要	
					1.「每一個人都應盡己之所能去保護自己的父母」這種說法是否適用於此情況？
					2. X此人會有何恩惠於我。
					3. 在此情況下無論X是何人，世上的陌生人是否都有權被救脫險？
					4. 拯救某一特殊的人物是否會帶來社會更多的好處？
					5. 不救父母或親人而去救陌生人是否太無情。
					6. 我是否有權只拯救那些我喜愛的人？
					7.「每一個人的生命都是同樣重要」的道理是否適用此情況：
					8. 我是否根據「人人都應擁有的平等基本人權」這個道理來決定救不救X：
					9. 我與X有甚麼個人關係？

將最重要的三個問題依次序排列：

第一重要　　第二重要　　第三重要

_____　　_____　　_____

罪犯

在下列五種不同的情況下，你偶然地發現一個人 X 作了一些犯法的事，你看着 X 向那裏逃走，其後更知道 X 躲藏的地方，你會否向警方告密如果 X 是 ___？

第一部份

（一）

X 持鎗打劫一間銀行而 你卻不清楚 X 打劫銀行的原因。

	一定會	多數會	可能會	不能決定	可能不會	多數不會	一定不會	X：
X_1								X_1 = 你的一個普通朋友
X_2								X_2 = 你的最好朋友
X_3								X_3 = 你的兄弟或姊妹
X_4								X_4 = 一個陌生人

（二）

假如你是一個警察

X 持鎗打劫一間銀行而你卻不清楚 X 打劫銀行的原因。

	一定會	多數會	可能會	不能決定	可能不會	多數不會	一定不會	X：
X_5								X_5 = 你的一個普通朋友
X_6								X_6 = 你的最好朋友
X_7								X_7 = 你的兄弟或姊妹
X_8								X_8 = 一個陌生人

在下列三种情況，不要假設你是一個警察。

（三）

X 的兒子患上一种罕有的絕症，性命危殆，醫生認為如能送他兒子往外國某一間醫院接受治療，或可痊癒，但是全部費用約需十萬元，X 沒有任何方法籌得那麼多錢，於是持鎗去打劫銀行

	一定會	多數會	可能會	不能決定	可能不會	多數不會	一定不會	X：
X_9								X_9 = 你的一個普通朋友
X_{10}								X_{10} = 你的最好朋友
X_{11}								X_{11} = 你的兄弟或姊妹
X_{12}								X_{12} = 一個陌生人

續第一部分

罪犯

(四)

假如在上列情況(三)中，患上罕有絕症的是<u>你</u>，而X打劫銀行的目的乃希望將劫得的錢用來為你醫病，除了打劫外，別無他法籌得那麼多錢。

	一定會	多數會	可能會	不能決定	可能不會	多數不會	一定不會	X：
X_{13}								X_{13} = 你的一個普通朋友
X_{14}								X_{14} = 你的最好朋友
X_{15}								X_{15} = 你的兄弟或姊妹

(五)

假如數日前，你所居住的地方發生地震，政府沒有妥善地照顧災區的難民，而只有很少數的富豪拿出錢來救濟這些災民。<u>X</u>目睹數千災民急需食物、醫藥及社會人士的關懷，心裏十分難過，乃去打劫銀行，將劫得的錢用來購買食物和藥物給這些災民。

	一定會	多數會	可能會	不能決定	可能不會	多數不會	一定不會	X：
X_{16}								X_{16} = 你的一個普通朋友
X_{17}								X_{17} = 你的最好朋友。
X_{18}								X_{18} = 你的兄弟或姊妹
X_{19}								X_{19} = 一個陌生人

第二部份　　罪犯

非常重要	很重要	頗重要	不大重要	毫不重要	
					1. 每個一個市民的責任，是否無論在任何情況下都應告發 X。
					2. X 打劫時所用的鎗是真的還是假的？
					3. 向警方告發自己的兄弟或姊妹是否太過無情？
					4. 當我決定了告發或不告發 X 之後，我是否能用我自己的道德觀念來自我解釋呢？
					5. 如不使 X 受法律制裁，對其他罪犯來說是否公平。
					6. 只適用於情況(二)：我是否甘冒受法律嚴懲之險而不告發 X？
					7. 只適用於情況(三)：社會是否有責任公平地照顧每一個人的基本需要(例如：生存的需要)。
					8. 只適用於情況(四)：告發一個為自己而去打劫銀行的人是否太過冷酷無情？
					9. 只適用於情況(五)：社會是否能容許某些人基於一些善良的理由去打劫而又能同時保障大多數人的安全和財產？

將最重要的三個問題依次序排列：

第一重要 _____　第二重要 _____　第三重要 _____

*聶強(HKMA), 1981

Appendix 5(D) Kohlberg's MJI: Form A

QUESTION BOOK

Instructions

1. Please read each of the following stories and the questions carefully.
2. Please make NO MARKS on this QUESTION BOOK. Write your answers on the ANSWER SHEETS.
3. Please give us the following information on the first page of the ANSWER BOOK: your name, age and sex.

STORY I

In Europe, a woman was near death from a special kind of cancer. There was one drug that the doctors thought might save her. It was a form of radium that a chemist in the same town had recently discovered. The drug was expensive to make. He paid £100 for the radium and charged £1,000 for a small dose of the drug. The sick woman's husband, Philip, went to everyone he knew to borrow the money, but he could only get together about £500 which is half of what it cost. He told the chemist that his wife was dying and asked him to sell it cheaper or let him pay later. But the chemist said, "No, I discovered the drug and I'm going to make money from it." So Philip gets desperate and considers breaking into the man's store to steal the drug for his wife.

1. Should Philip steal the drug? Why or why not?
2. If Philip doesn't love his wife, should he steal the drug for her? Why or why not?
3. (a) Suppose the person dying is not his wife but a stranger. Should Philip steal the drug for the stranger? Why or why not?

   (b) (Answer this question only if you favour stealing the drug for a stranger.) Suppose it is a pet animal he loves. Should Philip steal to save the pet animal? Why or why not?
4. Did the chemist have the right to charge that much when there was no law actually setting a limit to the price? Why or why not?
5. Is it important for people to do everything they can to save another's life? Why or why not?
6. It is against the law for Philip to steal. Does that make it morally wrong? Why or why not?
7. (a) Should people try to do everything they can to obey the law? Why or why not?

   (b) How does this apply to what Philip should do?

*L. Kohlberg, 1958,1979.

STORY II

Philip did break into the store. He stole the drug and gave it to his wife. In the newspaper the next day, there was an account of the robbery. Mr. Brown, a police officer who knew Philip, read the account. He remembered seeing Philip running away from the store and realized that it was Philip who stole the drug. Mr. Brown wonders whether he should report that Philip was the robber.

8. Should Officer Brown report Philip for stealing? Why or why not?

9. Officer Brown finds and arrests Philip. Philip is brought to court, and a jury is selected. The jury's job is to find whether a person is innocent or guilty of committing a crime. The jury finds Philip guilty. It is up to the judge to determine the sentence. Should the judge give Philip some sentence, or should he suspend the sentence and let Philip go free? Why?

10. (a) Thinking in terms of society, should people who break the law be punished? Why or why not?

    (b) How does this apply to how the judge should decide?

11. Philip was doing what his conscience told him when he stole the drug. Should a law-breaker be punished if he is acting out of conscience? Why or why not?

STORY III

Jack is a fourteen year old boy who wanted to go to camp very much. His father promised him he could go if he saved up the money for it himself. So Jack worked hard at his paper route and saved up the £20 it cost to go to camp and a little more besides. But just before camp was going to start, his father changed his mind. Some of his friends decided to go on a special fishing trip, and Jack's father was short of the money it would cost. So he told Jack to give him the money he had saved from the paper route. Jack didn't want to give up going to camp, so he thinks of refusing to give his father the money.

12. Should Jack refuse to give his father the money? Why or why not?

13. Is the fact that Jack earned the money himself the most important thing in the situation? Why or why not?

14. The father promised Jack he could go to camp if he earned the money. Is the fact that the father promised the most important thing in the situation? Why or why not?

15. Is it important to keep a promise? Why or why not?

16. Is it important to keep a promise to someone you don't know well and probably won't see again? Why or why not?

17. (a) What do you think is the most important thing a son should be concerned about in his relationship to his father?

    (b) Why is that the most important thing?

18. (a) What do you think is the most important thing a father should be concerned about in his relationship to his son?

    (b) Why is that the most important thing?

Appendix 5(E) Rest's DIT

OPINIONS ABOUT SOCIAL PROBLEMS

This questionnaire is aimed at understanding how people think about social problems. Different people often have different opinions about questions of right and wrong. There are no "right" answers in the way that there are right answers to math problems. We would like you to tell us what you think about several problem stories. The papers will be fed to a computer to find the average for the whole group, and no one will see your individual answers.

Please give us the following information:

Name _____ ___ female

Age _____ Years _____ Months. ___ male

* * * * * * * *

In this questionnaire you will be asked to give your opinions about several stories. Here is a story as an example.

Frank Jones has been thinking about buying a car. He is married, has two small children and earns an average income. The car he buys will be his family's only car. It will be used mostly to get to work and drive around town, but sometimes for vacation trips also. In trying to decide what car to buy, Frank Jones realized that there were a lot of questions to consider. Below there is a list of some of these questions.

If you were Frank Jones, how important would each of these questions be in deciding what car to buy?

Instructions for Part A: (Sample Question)

On the left hand side check one of the spaces by each statement of a consideration. (For instance, if you think that statement #1 is not important in making a decision about buying a car, check the space on the right.)

IMPORTANCE:

Great	Much	Some	Little	No	
				✓	1. Whether the car dealer was in the same block as where Frank lives. (Note that in this sample, the person taking the questionnaire did not think this was important in making a decision.)
✓					2. Would a used car be more economical in the long run than a new car. (Note that a check was put in the far left space to indicate the opinion that this is an important issue in making a decision about buying a car.)
		✓			3. Whether the color was green, Frank's favorite color.
				✓	4. Whether the cubic inch displacement was at least 200. (Note that if you are unsure about what "cubic inch displacement" means, then mark it "no importance.")
✓					5. Would a large, roomy car be better than a compact car.
				✓	6. Whether the front connibilies were differential. (Note that if a statement sounds like gibberish or nonsense to you, mark it "no importance.")

Instructions for Part B: (Sample Question)

From the list of questions above, select the most important one of the whole group. Put the number of the most important question on the top line below. Do likewise for your 2nd, 3rd and 4th most important choices. (Note that the top choices in this case will come from the statements that were checked on the far left-hand side--statements #2 and #5 were thought to be very important. In deciding what is the most important, a person would re-read #2 and #5, and then pick one of them as the most important, then put the other one as "second most important," and so on.)

MOST	SECOND MOST IMPORTANT	THIRD MOST IMPORTANT	FOURTH MOST IMPORTANT
5	2	3	1

STORY 1

In Europe a woman was near death from a special kind of cancer. There was one drug that doctors thought might save her. It was a form of radium that a druggist in the same town had recently discovered. The drug was expensive to make, but the druggist was charging ten times what the drug cost to make. He paid £200 for the radium and charged £2,000 for a small dose of the drug. The sick woman's husband, Heinz, went to everyone he knew to borrow the money, but he could only get together about £1,000, which is half of what it cost. He told the druggist that his wife was dying, and asked him to sell it cheaper or let him pay later. But the druggist said, "No, I discovered the drug and I'm going to make money from it." So Heinz got desperate and began to think about breaking into the man's store to steal the drug for his wife.

Should Heinz steal the drug? (Check one)

_____Should steal it _____Can't decide _____Should not steal it

IMPORTANCE:

Great	Much	Some	Little	No	
					1. Whether a community's laws are going to be upheld.
					2. Isn't it only natural for a loving husband to care so much for his wife that he'd steal?
					3. Is Heinz willing to risk getting shot as a burglar or going to jail for the chance that stealing the drug might help?
					4. Whether Heinz is a professional wrestler, or has considerable influence with professional wrestlers.
					5. Whether Heinz is stealing for himself or doing this solely to help someone else.
					6. Whether the druggist's rights to his invention have to be respected.
					7. Whether the essence of living is more encompassing than the termination of dying, socially and individually.
					8. What values are going to be the basis for governing how people act towards each other.
					9. Whether the druggist is going to be allowed to hide behind a worthless law which only protects the rich anyhow.
					10. Whether the law in this case is getting in the way of the most basic claim of any member of society.
					11. Whether the druggist deserves to be robbed for being so greedy and cruel.
					12. Would stealing in such a case bring about more total good for the whole society or not.

From the list of questions above, select the four most important:

Most important _____ Second most important _____

Third most important _____ Fourth most important _____

STORY II

A lady was dying of cancer which could not be cured and she had only about six months to live. She was in terrible pain, but she was so weak that a good dose of pain-killer like morphine would make her die sooner. She was delirious and almost crazy with pain, and in her calm periods, she would ask the doctor to give her enough morphine to kill her. She said she couldn't stand the pain and that she was going to die in a few months anyway.

What should the doctor do? (Check one)

_____ He should give the lady an overdose that will make her die _____ Can't decide _____ Should not give the overdose

IMPORTANCE:

Great	Much	Some	Little	No	
					1. Whether the woman's family is in favor of giving her the overdose or not.
					2. Is the doctor obligated by the same laws as everybody else if giving her an overdose would be the same as killing her.
					3. Whether people would be much better off without society regimenting their lives and even their deaths.
					4. Whether the doctor could make it appear like an accident.
					5. Does the state have the right to force continued existence on those who don't want to live.
					6. What is the value of death prior to society's perspective on personal values.
					7. Whether the doctor has sympathy for the woman's suffering or cares more about what society might think.
					8. Is helping to end another's life ever a responsible act of cooperation.
					9. Whether only God should decide when a person's life should end.
					10. What values the doctor has set for himself in his own personal code of behavior.
					11. Can society afford to let everybody end their lives when they want to.
					12. Can society allow suicides or mercy killing and still protect the lives of individuals who want to live.

From the list of questions above, select the four most important:

Most important _____ Second most important _____

Third most important _____ Fourth most important _____

STORY III

A man had been sentenced to prison for 10 years. After one year, however, he escaped from prison, moved to a new area of the country, and took on the name of Thompson. For 8 years he worked hard, and gradually he saved enough money to buy his own business. He was fair to his customers, gave his employees top wages, and gave most of his own profits to charity. Then one day, Mrs. Jones, an old neighbor, recognized him as the man who had escaped from prison 8 years before, and whom the police had been looking for.

Should Mrs. Jones report Mr. Thompson to the police and have him sent back to prison? (Check one)

____Should report him ____Can't decide ____Should not report him

IMPORTANCE:

Great	Much	Some	Little	No	
					1. Hasn't Mr. Thompson been good enough for such a long time to prove he isn't a bad person?
					2. Every time someone escapes punishment for a crime, doesn't that just encourage more crime?
					3. Wouldn't we be better off without prisons and the oppression of our legal systems?
					4. Has Mr. Thompson really paid his debt to society?
					5. Would society be failing what Mr. Thompson should fairly expect?
					6. What benefits would prisons be apart from society, especially for a charitable man?
					7. How could anyone be so cruel and heartless as to send Mr. Thompson to prison?
					8. Would it be fair to all the prisoners who had to serve out their full sentences if Mr. Thompson was let off?
					9. Was Mrs. Jones a good friend of Mr. Thompson?
					10. Wouldn't it be a citizen's duty to report an escaped criminal, regardless of the circumstances?
					11. How would the will of the people and the public good best be served?
					12. Would going to prison do any good for Mr. Thompson or protect anybody?

From the list of questions above, select the four most important:

Most important_____ Second most important_____

Third most important_____ Fourth most important_____

STORY IV

Mr. Webster was the owner and manager of a gas station. He wanted to hire another mechanic to help him, but good mechanics were hard to find. The only person he found who seemed to be a good mechanic was Mr. Lee, but he was Japanese. While Mr. Webster himself didn't have anything against Orientals, he was afraid to hire Mr. Lee because many of his customers didn't like Orientals. His customers might take their business elsewhere if Mr. Lee was working in the gas station.

When Mr. Lee asked Mr. Webster if he could have the job, Mr. Webster said that he had already hired somebody else. But Mr. Webster really had not hired anybody, because he could not find anybody who was a good mechanic besides Mr. Lee.

What should Mr. Webster have done? (Check one)

_____ Should have hired Mr. Lee _____ Can't decide _____ Should not have hired him

IMPORTANCE:

Great	Much	Some	Little	No	
					1. Does the owner of a business have the right to make his own business decisions or not?
					2. Whether there is a law that forbids racial discrimination in hiring for jobs.
					3. Whether Mr. Webster is prejudiced against orientals himself or whether he means nothing personal in refusing the job.
					4. Whether hiring a good mechanic or paying attention to his customers' wishes would be best for his business.
					5. What individual differences ought to be relevant in deciding how society's roles are filled?
					6. Whether the greedy and competitive capitalistic system ought to be completely abandoned.
					7. Do a majority of people in Mr. Webster's society feel like his customers or are a majority against prejudice?
					8. Whether hiring capable men like Mr. Lee would use talents that would otherwise be lost to society.
					9. Would refusing the job to Mr. Lee be consistent with Mr. Webster's own moral beliefs?
					10. Could Mr. Webster be so hard-hearted as to refuse the job, knowing how much it means to Mr. Lee?
					11. Whether the Christian commandment to love your fellow man applies in this case.
					12. If someone's in need, shouldn't he be helped regardless of what you get back from him?

From the list of questions above, select the four most important:

Most important _____ Second most important _____

Third most important _____ Fourth most important _____

APPENDIX 5(F) Computer Codes for the MDT Indices and Some Important Variables

Computer Code	Meaning
CTA TO CTK	Central Theme Score of each situation (or dilemma) (See Table 4.9 of the text)
N11 TO N51	Coefficients $\alpha_i(\beta_j)$ (See Tables 4.10 and 4.11 of the text)
J1 TO J5	Coefficients γ_1 TO γ_5
MCTA TO MCTE; MN16, MN36, MN415, MN51; MJ1 TO MJ5	The Count of the number of missing item responses in each of the indices CTA TO CTE; N16, N36, N415, N51; J1 TO J5 respectively
RANK J_k (k=1,2..6)	Sum of scores of all J_k (k=1,2,...6) statements ranked as one of the top 3 important choices
TRC01 TO TRC05	Ranking Score of the Part I items (See Section 4.4.1 (III) of the text)
NR01 TO NR13	Indices expressing the Part I item responses as a whole (See Section 4.5 (I) of the text)
RJ01 TO RJ13	Indices expressing the Part II item responses as a whole (excluding the J1 statements) (See Section 4.5 (II) of the text)
NRRJ01 TO NRRJ13 (WNRRJ01 TO WNRRJ13)	Indices expressing the Parts I and II item responses as a whole (excluding the J1 statements) (See Section 4.5 (III) of the text and Appendix 4)

APPENDIX 5(F) (continued)

Computer Code	Meaning
NATION	Cultural groups: 1=English; 2=Hong Kong Chinese 3=Malaysian; 9-Others
SEX	1=Male; 2=Female
MDTFORM	MDT Form: 1=Form A (English version) 2=Form B (English version) 3=Form A^{+} (English version) 4=Form A (Chinese version; order of items is opposite to that in English Form A) 5=Form A (Chinese version; order of items is same as that in English Form A) 21=Form A(IS) (English version)
TORDER	Test Order 1=1^{st} test, 2=2^{nd} test, etc.
MMS	Moral Maturity Score generated by responses to Kohlberg's Moral Judgement Instrument (MJI)
DIT	Defining Issues Test
DJ1 TO DJ5	Similar to J1 TO J5 of the MDT
DITP	P - score of the DIT
DITD	D - score of the DIT
SRT	Test score of Science Reasoning Tasks
RPM	Test score of Raven's Standard Progressive Matrices
JEPI	Junior Eysenck Personality Inventory
JEPIE	Extraversion Score
JEPIN	Neuroticism Score
JEPIL	Lie Scale Score

APPENDIX 6

Appendix 6.1 (A) MDT Part II Scoring Program

```
JOB(TEJT101,J6,T60,M6600)     H.K. MA
ATTACH(TAPE91,MHKMA3,ID=YEUE911)
MNF(E=1,R=3)
LGO.
0090000000000000000000
C THIS PROGRAM ONLY SCORES RANKING DATA OF THE MDT PART II.
C IT IS BASED ON A SIMILAR PROGRAM USED IN THE DIT RESEARCH BY
C PROFESSOR J.R. REST AND HIS ASSOCIATES.
      PROGRAM MDT2(TAPE91,INPUT,OUTPUT,TAPE8)
      INTEGER ID1,ID2,NCARD1,NCARD2,NCARD3,NATION,SEX,MDTFORM,TORDER
      INTEGER MR(20,5),MC(5,5)
      REAL AGE
      INTEGER MCARD4
      INTEGER FRMT(16),KEY(9,5)
      INTEGER RANK(3,5),RATE(9,5),ID,NUMSIT,SITVEC(5),MISS
      REAL STAGE(10),STAGESM
      INTEGER SITNAME(5),HEADING(7)
      INTEGER MREJ(900)
      DATA KEY/
     12,4,4,5,6,3,4,3,1,
     22,4,3,6,1,5,3,5,4,
     33,4,6,5,3,2,4,5,5,
     44,2,4,5,3,4,6,5,3,
     54,1,3,5,4,2,5,3,5/
      DATA SITNAME/
     110H  LOST BAG,
     210H   SINKING,
     310H    DOCTOR,
     410H  ACCIDENT,
     510H  CRIMINAL/
      READ 10,NUMSIT,SITVEC
   10 FORMAT (7I1)
      L=NUMSIT+1
      READ 60,FRMT
   60 FORMAT(8A10)
      NREJ=0
      DO 20 I=1,NUMSIT
      HEADING(I)=SITNAME(SITVEC(I))
   20 CONTINUE
      HEADING(L)=10H   TOTAL
      PRINT 5,NUMSIT,(HEADING(I),I=1,NUMSIT)
    5 FORMAT (///,5X,'PROGRAM MORALITY2: A SCORING PROGRAM FOR THE',
     A'MORAL DEVELOPMENT TEST II',/,
     B5X,'NUMBER OF SITUATIONS TO BE SCORED=',I2,/,
     C5X,'ORDER OF SITUATIONS=',5R10)
      PRINT 15,FRMT
   15 FORMAT(5X,'INPUT FORMAT= ',8A10/8A10)
      PRINT 30
   30 FORMAT(//,5X,'A VALUE OF 999. INDICATES THAT THE SCORE CAN NOT BE
     ACOMPUTED BECAUSE OF MISSING DATA.')
      PRINT 25
   25 FORMAT(/////,
     A42H SUBJECT   *****STAGE      SUBSCORES***** ,
     A42H         PERCENT     PERCENT   MISSING     ,/,
     A42H    ID     M     2     3     4     5     6,
     A49H    P      P     R     R       SCORE      STAGESM ,//)
   70 CONTINUE
      NCARD4=4
      READ(91,FRMT) ID,((RT(I,J),J=1,9),(RK(I,K),K=1,3),I=1,NSTORY)
      IF (EOF(91)) 271,71,271
   71 DO 80 J=1,NUMSIT
      DO 80 I=1,9
```

```
      IF (RATE(I,J).LT.1.OR.RATE(I,J).GT.5)  GO TO 80
      K=KEY(I,SITVEC(J))
   80 CONTINUE
      STAGE(1)=STAGE(2)=STAGE(3)=STAGE(4)=STAGE(5)=STAGE(6)=0
      STAGESM=0
      MISS=0
      DO 100 J=1,NUMSIT
      DO 90 I=1,3
      IF (RANK(I,J).LT.1.OR.RANK(I,J).GT.9)  GO TO 85
      K=KEY(RANK(I,J),SITVEC(J))
      STAGE(K)=STAGE(K)+4-I
      STAGESM=STAGESM+4.-FLOAT(I)
      GO TO 90
   85 MISS=MISS+1
   90 CONTINUE
  100 CONTINUE
      IF (STAGESM.EQ.30.)   GO TO 105
      IF (STAGESM.EQ.0.0)  GO TO 160
      SCALE=30./STAGESM
      DO 115 I=1,6
      STAGE(I)=STAGE(I)*SCALE
  115 CONTINUE
  105 CONTINUE
      STAGE(7)=STAGE(5)+STAGE(6)
      STAGE(8)=100.*STAGE(7)/29.0
      STAGE(9)=2*STAGE(2)+3*STAGE(3)+4*STAGE(4)+5*STAGE(5)+5*STAGE(6)
      STAGE(10)=100.*STAGE(9)/149.0
      GO TO 180
  160 CONTINUE
      STAGE(1)=STAGE(2)=STAGE(3)=STAGE(4)=STAGE(5)=STAGE(6)=STAGE(7)=
     CSTAGE(8)=STAGE(9)=STAGE(10)=999.
  180 CONTINUE
      PRINT 120, ID,STAGE,MISS,STAGESM
  120 FORMAT (2X,I5,10F6.1,7X,I2,8X,F4.1)
      IF (STAGE(1).GT.6.0) GO TO 200
      GO TO 70
  200 NREJ=NREJ+1
      MREJ(NREJ)=ID
      GO TO 70
  271 PRINT 210,NREJ
  210 FORMAT(//10X,'NUMBER OF SUBJECTS WITH M SCORE GREATER THAN 6:'I5)
      IF(NREJ.EQ.0) GO TO 999
      PRINT 215
  215 FORMAT(//10X,'SUBJECT IDS:',/)
      PRINT 220,  (MREJ(J),J=1,NREJ)
  220 FORMAT(10X,10(I5,2X))
  999 STOP
      END
000000000000000000000
512345
(A5,24X,9I1,3I1,17X,9I1,3I1,/29X,9I1,3I1,17X,9I1,3I1,/30X,9I1,3I1)
000000000000000000000
```

Appendix 6.1 (B) MDT Part II: Rate - rank Consistency Check

```
JOB(TEJT214,J6,T60,M6600)     H.K. MA
ATTACH(TAPE91,NHKMA3,ID=YEUE911)
MNF(E=1,R=3)
LGO.
D0000000000000000000000
      PROGRAM MDTCON (TAPE91,INPUT,OUTPUT)
C  THIS PROGRAM IS BASED ON A SIMILAR PROGRAM WRITTEN BY STEPHEN ROBBINS
C  IN APRIL,1977 FOR DIT RESEARCHES
C  THIS PROGRAM DETERMINES THE CONSISTENCY OF A SUBJECTS RATING DATA
C  WITH HIS RANKING DATA
C  THE PROGRAM WILL CHECK SEVERAL DIFFERENT ERROR CRITERIA.  THE
C  NORMAL CRITERION FOR REJECTION OF A SUBJECT IS MORE THAN 6 ERRORS IN A
C  SINGLE STORY OR MORE THAN 2 STORIES WITH AN ERROR - ALWAYS WITH
C  RESPECT TO THE FIRST 2 RANKS. BUT THE PROGRAM WILL CHECK OTHER
C  CRITERION AS SPECIFIED IN THE NSTOR AND NERR PARAMETERS
C  THE VARIABLES USED ARE DOCUMENTED BELOW
C
C  NSTORY -- THE NUMBER OF STORIES TO BE PROCESSED
C  NCRIT -- THE NUMBER OF DIFFERENT CRITERION PAIRS TO BE CHECKED
C  NORMALLY ONE
C  NRANK -- THE NUMBER OF RANKS TO BE CHECKED -NORMALLY 2
C  IANCH -- ANCHOR PARAMETER,NORMALLY BLANK,BUT SET TO 1 IF RATINGS
C  ARE SCORED AS 5 (GREATEST) TO 1 (LEAST)
C  NSTOR -- THE NUMBER OF STORIES IN WHICH ERRORS ARE ALLOWED BEFORE
C  REJECTING,NORMALLY 2
C  NERR -- THE NUMBER OF ERRORS ALLOWED IN A SINGLE STORY BEFORE
C  REJECTING,NORMALLY 8
C  NS - COUNTER FOR NUMBER OF SUBJECTS
      INTEGER NSTOR(16),NERR(16),IFLAG(16),NBAD(500),KNT(5),ES(4)
      INTEGER NSUB(16,500),NREJTOT(16),BRATE(500),NMISS(500)
      INTEGER FRMT(8),RT(6,9),RK(6,4),KR,KERR
      NS=NB=NBRT=NM=0
      DO 10 I=1,16
      DO 10 J=1,500
   10 NSUB(I,J)=0
      DO 20 I=1,16
   20 NREJTOT(I)=0
C
C  READ STORY/CRITERION NUMBER CARD AND CRITERION SPECIFICATION CARD
C
      READ 30,NSTORY,NCRIT,NRANK
      READ 30, (NSTOR(I),NERR(I),I=1,NCRIT)
   30 FORMAT(16I5)
C
C  READ IN FORMAT CARD SPECIFYING DATA CARD STRUCTURE
C
      READ 40,FRMT
   40 FORMAT(8A10)
C
C  READ IN RATE-RANK DATA FOR ONE SUBJECT
C
   50 READ(91,FRMT) ID,((RT(I,J),J=1,9),(RK(I,K),K=1,3),I=1,NSTORY)
      IF(EOF(91))500,60,500
   60 NS=NS+1
      KFLAG=LFLAG=0
      DO 200 I=1,NSTORY
C
C  BEGIN SIMPLE CHECKS ON RATING VALUES,PROCESSING ONE STORY AT A TIME
C
      DO 55 K=1,5
   55 KNT(K)=0
C  BRATE - ARRAY OF SUBJECT IDS WITH MISSING RATINGS
```

```
C NBRT - COUNTER OF SUBJECTS WITH MISSING RATINGS
C
      DO 80 J=1,9
      IF (RT(I,J).LT.1)  72,73
   72 RT(I,J)=0
      IF(KFLAG.EQ.1) GO TO 73
      NBRT=NBRT+1
      BRATE(NBRT)=ID
      KFLAG=1
C
C BEGIN CHECK TO DETERMINE WHETHER ONE RATE IS USED EXCESSIVELY -
C KNT IS AN ARRAY OF NUMBERS OF RATES IN EACH CATEGORY 1-5
C IF A KNT VALUE IS GREATER THAN 7,STORE SUBJECTS ID --IFLAG IS A
C FLAG TO NOTE IF SUBJECT HAS ALREADY FAILED THIS TEST
C STORE ID OF SUBJECT WITH BAD RATES IN NBAD
C INCREMENT NB - A COUNTER OF SUBJECTS FAILING THIS TEST
C
   73 DO 70 K=1,5
      IF(RT(I,J).EQ.K) KNT(K)=KNT(K)+1
   70 CONTINUE
   80 CONTINUE
      DO 90 K=1,5
      IF(KNT(K).GT.7)  GO TO 95
   90 CONTINUE
      GO TO 200
   95 IF (LFLAG.EQ.1) GO TO 201
      NB=NB+1
      NBAD(NB)=ID
      LFLAG=1
  200 CONTINUE
C
C BEGIN CONSISTENCY CHECKS ON RATES,ONE STORY AT A TIME.
C NOTE: PROGRAM ALSO CYCLES SIMULTANEOUSLY AT EACH STEP THROUGH EACH
C CRITERION PAIR
C ES - AN ARRAY OF ERRORS IN EACH RANK CATEGORY,USUALLY 1-2,
C FOR EACH SPECIFIC STORY
C KR - THE RATE OF ITEM RANKED FIRST,SECOND,ETC.
C
  201 DO 210 LL=1,NCRIT
  210 IFLAG(LL)=0
      NSCRIT=JFLAG=0
      DO 300 I=1,NSTORY
       DO 220 K=1,NRANK
      ES(K)=0
      IF(RK(I,K).LT.1.OR.RK(I,K).GT.9) GO TO 299
      KR=RT(I,RK(I,K))
      IF(KR.LE.0) GO TO 299
      DO 220 J=1,9
      IF(K.GE.2.AND.J.EQ.RK(I,1))  GO TO 220
      IF(K.EQ.3.AND.J.EQ.RK(I,2)) GO TO 220
      IF(RT(I,J).GE.KR) GO TO 220
      ES(K)=ES(K)+1
  220 CONTINUE
C KERR - A COUNT OF THE TOTAL NUMBER OF ERRORS WITHIN A STORY
      KERR=0
      DO 230 K=1,NRANK
      KERR=KERR+ES(K)
  230 CONTINUE
C
C NSCRIT - COUNTER FOR NUMBER OF STORIES WITH ERRORS IN RANKS 1 -NRANK
C
      IF (KERR.GE.1) NSCRIT=NSCRIT+1
C
C CHECK TO DETERMINE IF KERR GREATER THAN NUMBER OF ERRORS ALLOWED
C WITHIN A SINGLE STORY
C IF CHECK IS FAILED,STORE SUBJECT ID IN NSUB AFTER INCREMENTING
```

```
C  THE COUNTER OF SUBJECT REJECTS = NREJTOT
C
      DO 250 M=1,NCRIT
      IF(IFLAG(M).EQ.1) GO TO 250
      IF(KERR.GT.NERR(M)) GO TO 245
      GO TO 250
  245 NREJTOT(M)=NREJTOT(M)+1
      IFLAG(M)=1
      NSUB(M,NREJTOT(M))=ID
  250 CONTINUE
      GO TO 300
C
C STORE ID OF ANY SUBJECT MISSING A RATE OF A RANKED ITEM
C JFLAG SIMPLY CHECKING TO SEE IF SUBJECT CAUGHT BEFORE ON A PREVIOUS
C STORY
C
  299 IF(JFLAG.EQ.1) GO TO 300
      NM=NM+1
      NMISS(NM)=ID
      JFLAG=1
  300 CONTINUE
C
C AFTER CYCLING THROUGH ALL THE STORIES,BEGIN CHECK TO DETERMINE IF
C NSCRIT GREATER THAN THE NUMBER OF STORIES ALLOWED WITH ERRORS IN
C RANKS 1 - NRANK
C IF SO, STORE ID IN NSUB - UNLESS ID ALREADY STORES AS DETERMINED
C BY IFLAG
C
      DO 325 M=1,NCRIT
      IF (IFLAG(M).EQ.1) GO TO 325
      IF (NSCRIT.GT.NSTOR(M)) GO TO 320
      GO TO 325
  320 NREJTOT(M)=NREJTOT(M)+1
      NSUB(M,NREJTOT(M))=ID
  325 CONTINUE
C
C CYCLE BACK TO READ IN NEXT SUBJECT
C
      GO TO 50
  500 CONTINUE
C BEGIN PRINTS
C
      XNS=NS
      DO 600 I=1,NCRIT
      KTOTREJ=NREJTOT(I)
      PS=KTOTREJ/XNS
      PRINT 36,NSTORY
   36 FORMAT(//,10X,'NUMBER OF STORIES INPUT=',I6,/)
      PRINT 38,FRMT
   38 FORMAT(//,10X,'INPUT FORMAT=',8A10)
      PRINT 303,NERR(I),NSTOR(I),KTOTREJ,PS
  303 FORMAT(//,10X,'NUMBER OF REJECTED SUBJECTS WITH MORE THAN',I4,1X,
     C'ERRORS IN A SINGLE STORY',/,10X,'AND/OR MORE THAN',I4,1X,'STORIES
     CWITH INCONSISTENCIES:',I6,/,10X,'PROPORTION:',F10.4)
      IF(KTOTREJ.EQ.0)GO TO 447
      PRINT 424
  424 FORMAT(/,5X,'SUBJECT IDS:',/)
      IF(KTOTREJ.GT.2.) GO TO 600
      PRINT 422,(NSUB(I,LL),LL=1,KTOTREJ)
  422 FORMAT(5X,A5)
      GO TO 447
  600 PRINT 428,(NSUB(I,LL),LL=1,KTOTREJ)
  428 FORMAT(5X,19A8)
  447 PRINT 446,NB
  446 FORMAT(//,10X,'SUBJECTS REJECTED FOR RATING THE SAME NUMBER OF THE
     (SCALE MORE THAN 7 TIMES:',I6,/)
```

```
      IF(NB.EQ.0) GO TO 471
      PRINT 449
  449 FORMAT(/,5X,'SUBJECT IDS:'/)
      IF(NB.GT.20) GO TO 467
      PRINT 445,(NBAD(I),I=1,NB)
  445 FORMAT(5X,10A8)
      GO TO 471
  467 PRINT 468,(NBAD(I),I=1,NB)
  468 FORMAT(5X,10A8)
  471 IF(NBRT.EQ.0) GO TO 491
      PRINT 470
  470 FORMAT(/,10X,'SUBJECTS WITH RATE(S) GREATER THAN 5 OR ',/,10X,
     C'LESS THAN 1 - VALUE SET TO ZERO BY PROGRAM:')
      PRINT 449
      PRINT 445,(BRATE(I),I=1,NBRT)
  491 IF(NM.EQ.0) GO TO 448
      PRINT 430,NM
  430 FORMAT(/,10X,'SUBJECTS MISSING RANK OR RATE OF RANKED ITEM:',I6)
      PRINT 445,(NMISS(I),I=1,NM)
  448 PRINT 423,NS
  423 FORMAT(/,'TOTAL NUMBER OF SUBJECTS:',I6)
      STOP
      END
0000000000000000000000
    5    1    2
    2    6
(A5,24X,9I1,3I1,17X,9I1,3I1,/29X,9I1,3I1,17X,9I1,3I1,/30X,9I1,3I1)
0000000000000000000000
0000000000000000000000
```

APPENDEX 6.2 LONDON STUDY

Appendex 6.2. (A) Test-Retest Reliability: CLASS 21

CLASS CODE / MDT INDEX	21 (N=20)		21, 22 & 42 (N=56)	
CTA	0.714	***	0.659	***
CTB	0.655	***	0.842	***
CTC	0.537	**	0.669	***
CTD	0.597	**	0.566	***
CTE	0.517	**	0.656	***
Average CT	0.604	na	0.678	na
N16	0.409	*	0.776	***
N36	0.691	***	0.843	***
N415	0.510	*	0.668	***
N51	0.642	***	0.664	***
Average N	0.563	na	0.738	na
NR01	0.493	*	0.713	***
NR02	0.505	*	0.726	***
NR03	0.513	**	0.737	***
NR11	0.466	*	0.709	***
NR12	0.488	*	0.700	***
NR13	0.503	*	0.700	***
Average NR	0.495	na	0.714	na

Significance: *$p \leq 0.05$ **$p \leq 0.01$ ***$p \leq 0.001$ na= not applicable

TABLE A.6.2.1

Appendix 6.2. (B) Test-Retest Reliability: CLASS 42 (N=19)

The following table shows the test-retest reliability(r) of the MDT indices of the Class 42 including the subject who gave extremely opposite response patterns of the Part II of his first and second MDT.

	r	p		r	p
N16	0.615	**	CTA	0.783	***
N36	0.925	***	CTB	0.779	***
N415	0.794	***	CTC	0.614	**
N51	0.633	**	CTD	0.728	***
			CTE	0.749	***
Average N	0.742	na	Average CT	0.731	na
NR01	0.798	***	NRRJ01	0.933	***
NR02	0.839	***	NRRJ02	0.951	***
NR03	0.860	***	NRRJ03	0.957	***
NR11	0.831	***	NRRJ11	0.934	***
NR12	0.850	***	NRRJ12	0.941	***
NR13	0.862	***	NRRJ13	0.941	***
Average NR	0.840	na	Average NRRJ	0.943	na
J1	0.673	***	WNRRJ01	0.930	***
J2	0.865	***	WNRRJ02	0.944	***
J3	0.796	***	WNRRJ03	0.949	***
J4	0.667	***	WNRRJ11	0.924	***
J5	0.626	**	WNRRJ12	0.952	***
			WNRRJ13	0.928	***
Average J	0.725	na	Average WNRRJ	0.938	na
RJ01	0.458	*			
RJ02	0.394	*			
RJ03	0.370				
RJ11	0.537	**			
RJ12	0.454	*			
RJ13	0.405	*			
Average RJ	0.436	na			

Significance: *$p \leq 0.05$ **$p \leq 0.01$ ***$p \leq 0.001$

TABLE A.6.2.2.

Appendix 6.2. (C) Internal Consistency Reliability of CT and NR-indices (N=370)

	r	σ_i	σ_{meas}
CTA	0.750	1.186	0.593
CTB	0.899	1.269	0.403
CTC	0.492	0.882	0.904
CTD	0.817	0.934	0.400
CTE	0.929	1.199	0.320
N16	0.877	1.185	0.416
N36	0.669	0.728	0.419
N415	0.907	0.930	0.284
N51	0.475	0.810	0.587
NR01	0.851	2.280	0.880
NR02	0.802	2.681	1.193
NR03	0.763	3.134	1.526
Average NR	0.805	na	na

TABLE A.6.2.3.

Notes:
(1) The sample used consists of 104 F.2, 54 F.3, 108 F.4, 55 F.6 and 49 adult subjects. The total N=370.

(2) Rejecting Criteria used: REJECT IF (MCTALL LT 48)

Appendix 6.2. (D) Internal Consistency Reliability of J and RJ-indices (N=146)

	r	σ_i	σ_{meas}
J2	0.405	0.681	0.525
J3	0.629	0.595	0.362
J4	0.578	0.525	0.341
J5	0.548	0.442	0.297
RJ01	0.233	0.893	0.782
RJ02	0.236	1.077	0.941
RJ03	0.244	1.296	1.127
Average RJ	0.238	na	na

TABLE A.6.2.4.

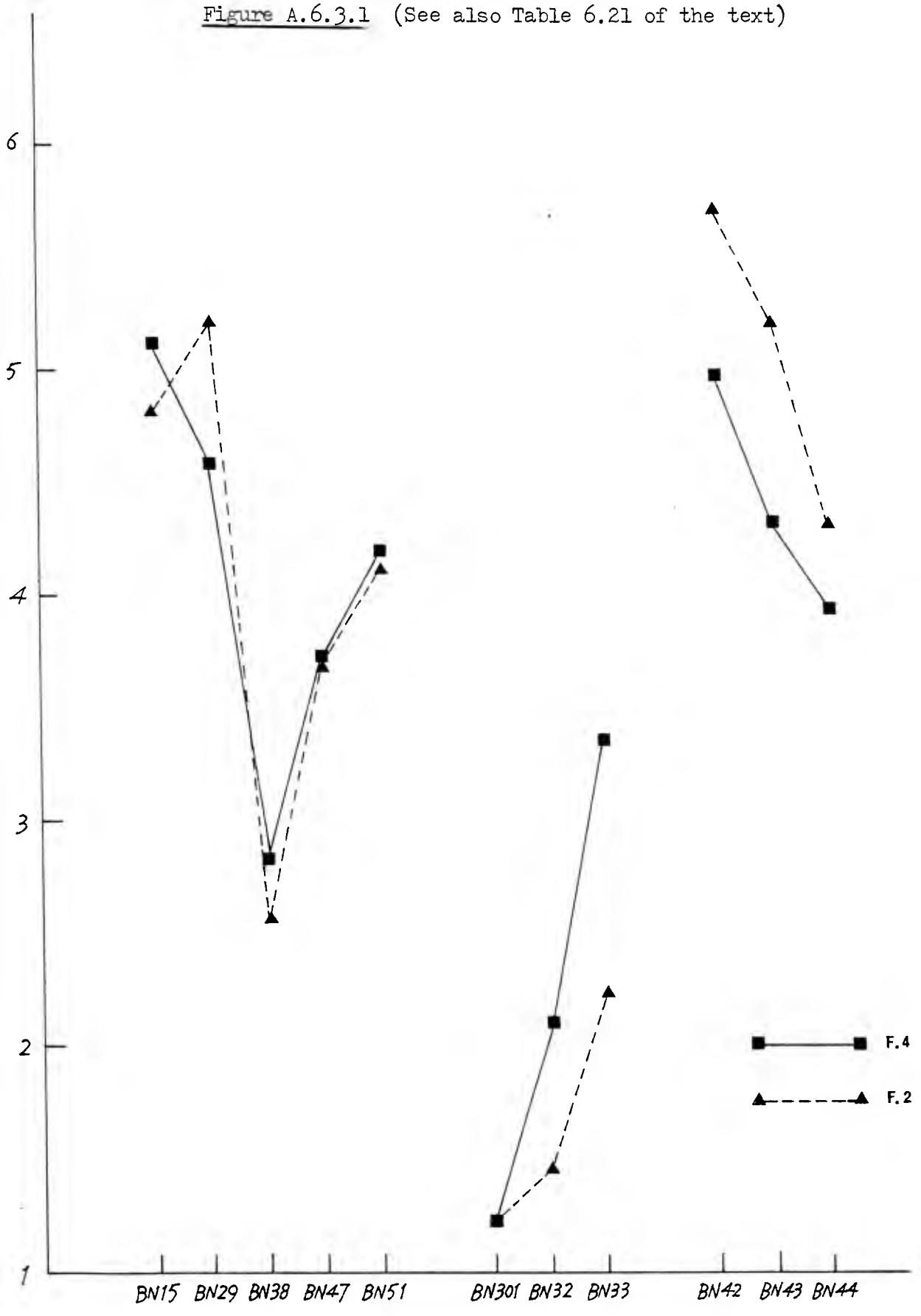
Notes:
(1) The sample used consists of 36 F.3, 72 F.4 and 38 adult subjects. The total N=146.

(2) Rejecting Criteria used: REJECT IF (MCTALL LT 48 or MJALL LT 42)

APPENDIX 6.3 MDT Form B: London Study

Appendix 6.3.1 The Order of Some Important BN - indices

Figure A.6.3.1 (See also Table 6.21 of the text)



Appendix 6.3.2 Central Theme Scores of the MDT Form B

TABLE A.6.3.1 Pearson Correlations: CT — Indices

PEARSON CORRELATION COEFFICIENTS

	CTD	CTF	CTG	CTH	CTK	BNR03
CTD	1.0000 (0) S= .001	.4626 (52) S= .001	.0130 (52) S= .464	-.0276 (52) S= .423	.0005 (52) S= .498	.1177 (52) S= .203
CTF	.4626 (52) S= .001	1.0000 (0) S= .001	-.1278 (52) S= .183	.1106 (52) S= .217	.0820 (52) S= .282	.4606 (52) S= .001
CTG	.0130 (52) S= .464	-.1278 (52) S= .183	1.0000 (0) S= .001	.0492 (52) S= .365	.1710 (52) S= .113	-.7474 (52) S= .001
CTH	-.0276 (52) S= .423	.1106 (52) S= .217	.0492 (52) S= .365	1.0000 (0) S= .001	.0287 (52) S= .420	.4236 (52) S= .001
CTK	.0005 (52) S= .498	.0820 (52) S= .282	.1710 (52) S= .113	.0287 (52) S= .420	1.0000 (0) S= .001	-.2405 (52) S= .043
BNR03	.1177 (52) S= .203	.4606 (52) S= .001	-.7474 (52) S= .001	.4236 (52) S= .001	-.2405 (52) S= .043	1.0000 (0) S= .001

(COEFFICIENT / CASES / SIGNIFICANCE) (99.0000 MEANS UNCOMPUTABLE)

Appendix 6.3.3 Relationships Between CT and BN-indices

TABLE A.6.3.2 Pearson Correlations: CT & BN-Indices

- - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - -

	CTD	CTF	CTG	CTH	CTK	BN15	BN29	BN38	BN47	BN51
BN15	.0514 (52) S= .359	-.0427 (52) S= .382	.0807 (52) S= .285	.0896 (52) S= .264	.6935 (52) S= .001	1.0000 (52) S= .001	.1094 (52) S= .220	-.1469 (52) S= .149	-.0265 (52) S= .426	-.2176 (52) S= .061
BN29	-.4071 (52) S= .001	-.8643 (52) S= .001	.4334 (52) S= .001	-.0394 (52) S= .391	.0648 (52) S= .324	.1094 (52) S= .220	1.0000 (52) S= .001	-.0995 (52) S= .241	-.5301 (52) S= .001	-.5474 (52) S= .001
BN38	.2091 (52) S= .068	.1914 (52) S= .087	.2293 (52) S= .051	-.6820 (52) S= .001	.0816 (52) S= .283	-.1469 (52) S= .149	-.0995 (52) S= .241	1.0000 (52) S= .001	-.2941 (52) S= .017	-.2294 (52) S= .051
BN47	.4474 (52) S= .001	.7507 (52) S= .001	-.0052 (52) S= .485	.6207 (52) S= .001	.0910 (52) S= .260	-.0265 (52) S= .426	-.5301 (52) S= .001	-.2941 (52) S= .017	1.0000 (52) S= .001	.1617 (52) S= .126
BN51	.0121 (52) S= .466	.2811 (52) S= .022	-.9480 (52) S= .001	.0334 (52) S= .407	-.2388 (52) S= .044	-.2176 (52) S= .061	-.5474 (52) S= .001	-.2294 (52) S= .051	.1617 (52) S= .126	1.0000 (52) S= .001
BNR03	.1177 (52) S= .203	.4606 (52) S= .001	-.7474 (52) S= .001	.4236 (52) S= .001	-.2405 (52) S= .043	-.2191 (52) S= .059	-.6299 (52) S= .001	-.5394 (52) S= .001	.5642 (52) S= .001	.8562 (52) S= .001

(COEFFICIENT / CASES / SIGNIFICANCE) (99.0000 MEANS UNCOMPUTABLE)

APPENDIX 6.4 Relationships Between MDT Forms A & B (Part I only)

TABLE A. 6.4

P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S

	BXR01	BXR02	BXRC3	BXR11	BXR12	BXR13
NR01	.3925	.3827	.3744	.4030	.3957	.3889
	(44)	(44)	(44)	(44)	(44)	(44)
	S= .004	S= .005	S= .006	S= .003	S= .004	S= .005
NR02	.4089	.4016	.3949	.4227	.4171	.4109
	(44)	(44)	(44)	(44)	(44)	(44)
	S= .003	S= .005	S= .004	S= .002	S= .002	S= .003
NR03	.4134	.4079	.4023	.4291	.4247	.4191
	(44)	(44)	(44)	(44)	(44)	(44)
	S= .003	S= .003	S= .003	S= .002	S= .002	S= .002
NR11	.3923	.3829	.3748	.4074	.4018	.3960
	(44)	(44)	(44)	(44)	(44)	(44)
	S= .004	S= .005	S= .006	S= .003	S= .003	S= .004
NR12	.4111	.4047	.3985	.4282	.4248	.4201
	(44)	(44)	(44)	(44)	(44)	(44)
	S= .003	S= .003	S= .004	S= .002	S= .002	S= .002
NR13	.4174	.4133	.4086	.4357	.4339	.4300
	(44)	(44)	(44)	(44)	(44)	(44)
	S= .002	S= .003	S= .003	S= .002	S= .002	S= .002

(COEFFICIENT / CASES / SIGNIFICANCE)   (99.0000 MEANS UNCOMPUTABLE)

APPENDIX 6.5. HONG KONG STUDY

Appendix 6.5. (A) Internal Consistency Reliability (r_i)

I. MDT Part I

	r_i	σ_i	σ_{meas}
CTA	0.865	1.418	0.521
CTB	0.886	1.251	0.422
CTC	0.565	1.009	0.666
CTD	0.798	0.984	0.442
CTE	0.899	1.012	0.322
N16	0.879	1.226	0.427
N36	0.601	0.662	0.418
N415	0.885	0.835	0.283
N51	0.604	0.973	0.612
NR01	0.879	2.590	0.901
NR02	0.844	3.100	1.224
NR03	0.816	3.660	1.436
Average NR	0.846	na	na

TABLE A.6.5.1(i).

Notes:
(1) The sample consists of 20 F.4, 153 F.5, 33 F.6 and 24 adult subjects. The total N=230.

(2) Rejecting Criteria used: REJECT IF (MCTALL LT 48)
[This is equivalent to SELECT IF (MCTALL EQ 48)]

II. MDT Part II

	r_i	σ_i	σ_{meas}
J2	0.258	0.611	0.526
J3	0.591	0.543	0.347
J4	0.515	0.480	0.334
J5	0.548	0.457	0.307
RJ01	0.431	1.030	0.777
RJ02	0.476	1.290	0.934
RJ03	0.493	1.570	1.118
Average RJ	0.467	na	na

TABLE A.6.5.1(ii).

Notes:
(1) The sample consists of 20 F.4, 142 F.5, 33 F.6 and 22 adult subjects. The total N=217.

(2) Rejecting Criteria used: REJECT IF (MJALL LT 42)

Appendix 6.5(B) Qualitative Analysis of the MDT Item Responses

(I) Means and Standard Deviations of the MDT Item Responses (N = 257)

Table A.6.5.2 (i) MDT Part I Item Responses

VARIABLE	CASES	MEAN	STD DEV
AGE	250	17.8160	2.0937
AA01	257	4.0389	2.0402
AA02	256	3.5430	2.0287
AA03	257	2.6965	1.7302
AA04	256	3.5938	1.8930
AA05	256	4.2148	1.7703
AA06	256	6.1641	1.4594
BA01	257	5.2374	1.7681
BA02	257	5.2023	1.8055
BA03	255	4.3686	1.8351
BA04	257	2.2529	1.2571
BA05	256	2.9609	1.3425
BA06	253	5.1700	1.6007
BA07	252	5.5833	1.7162
BA08	256	3.2500	1.8163
BA09	257	1.6618	1.0452
CA01	257	4.5253	1.9346
CA02	257	2.3735	1.4766
CA03	257	3.1401	1.5922
CA04	257	4.0272	1.8337
CA05	254	3.9567	1.8549
CA06	255	4.5451	2.0071
DA01	256	1.3164	1.0201
DA02	255	4.4863	1.5845
DA03	255	4.9451	1.7037
DA04	257	4.1323	1.9034
DA05	255	4.9961	1.7513
DA06	256	2.0195	1.1077
DA07	255	2.6314	1.5361
DA08	257	4.8288	1.6280
DA09	256	3.5664	1.7183
EA01	257	3.2062	1.4791
EA02	257	4.4942	1.7142
EA03	257	5.2140	1.7625
EA04	257	1.5728	1.0287
EA05	257	2.3619	1.4622
EA06	256	3.4531	1.6983
EA07	257	4.2490	1.8751
EA08	257	1.2957	1.0561
EA09	257	4.2802	1.5307
EA10	257	5.0000	1.6583
EA11	257	5.4747	1.7634
EA12	257	3.3969	1.8199
EA13	257	5.3113	1.7996
EA14	257	5.4514	1.8196
EA15	257	5.5486	1.9642
EA16	257	4.9300	1.6686
EA17	257	5.3696	1.6746
EA18	257	5.7121	1.6544
EA19	257	4.6420	1.9834

Table A.6.5.2 (ii) MDT Part II Item Responses

VARIABLE	CASES	MEAN	STD DEV
AGE	250	17.8160	2.0937
AC01	257	3.2646	1.3317
AC02	257	2.4553	1.1920
AC03	257	2.9339	1.2958
AC04	255	2.5059	1.1868
AC05	257	2.7432	1.1303
AC06	257	3.2140	1.2171
AC07	249	3.3414	1.2443
AC08	255	3.8275	1.2835
AC09	257	4.2374	1.1014
BC01	255	2.7843	1.2378
BC02	257	2.8132	1.2359
BC03	253	2.8814	1.0662
BC04	256	2.9570	1.1624
BC05	256	2.1328	1.0126
BC06	256	2.7617	1.2116
BC07	256	2.0586	1.0216
BC08	256	2.0703	1.0530
BC09	257	3.3035	1.3583
CC01	255	3.8471	1.0741
CC02	257	3.2296	1.0670
CC03	256	2.8711	1.1795
CC04	254	3.0945	1.3123
CC05	256	2.0039	.9802
CC06	257	2.8716	1.1839
CC07	255	3.5176	1.1956
CC08	256	3.0430	1.3898
CC09	256	2.3203	1.2738
DC01	257	1.5214	.9845
DC02	257	4.0973	1.0799
DC03	256	2.6641	1.1257
DC04	257	3.2412	1.3066
DC05	257	1.7860	1.0775
DC06	256	2.9688	1.2891
DC07	255	2.6667	1.2338
DC08	257	3.4475	1.1242
DC09	256	2.6094	1.4430
EC01	256	2.8203	1.0361
EC02	257	3.6031	1.4052
EC03	256	2.2422	1.1665
EC04	255	3.0235	1.2857
EC05	256	2.8086	1.2705
EC06	254	2.8819	1.2706
EC07	257	2.1518	1.1610
EC08	257	1.9494	1.1530
EC09	256	2.7188	1.3573

(II) Graphical Representation of the Means of MDT Part I Item Responses

Figure A.6.5.1 (A) A Lost Bag

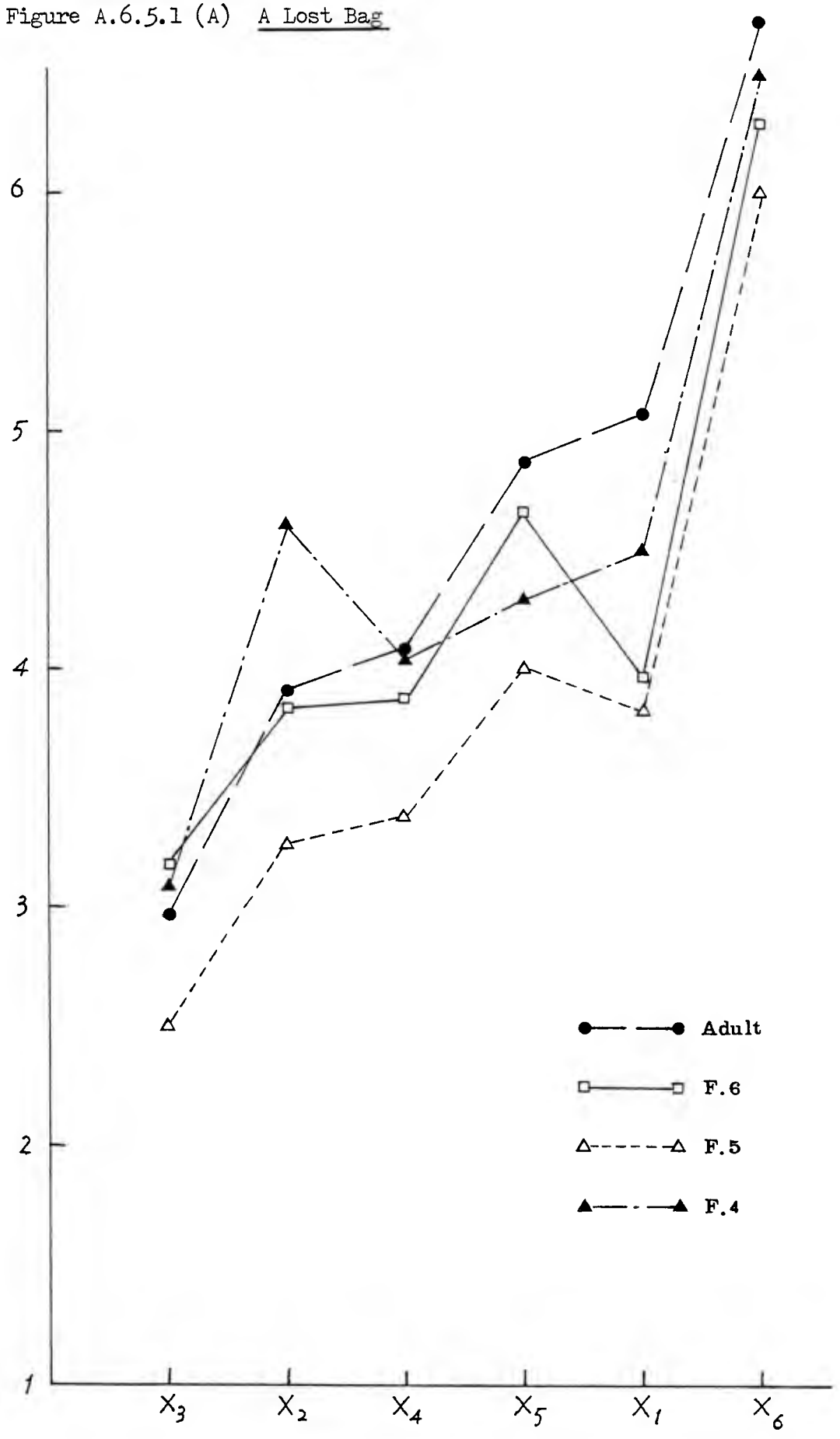


Figure A.6.5.1.(B) The Sinking Boat

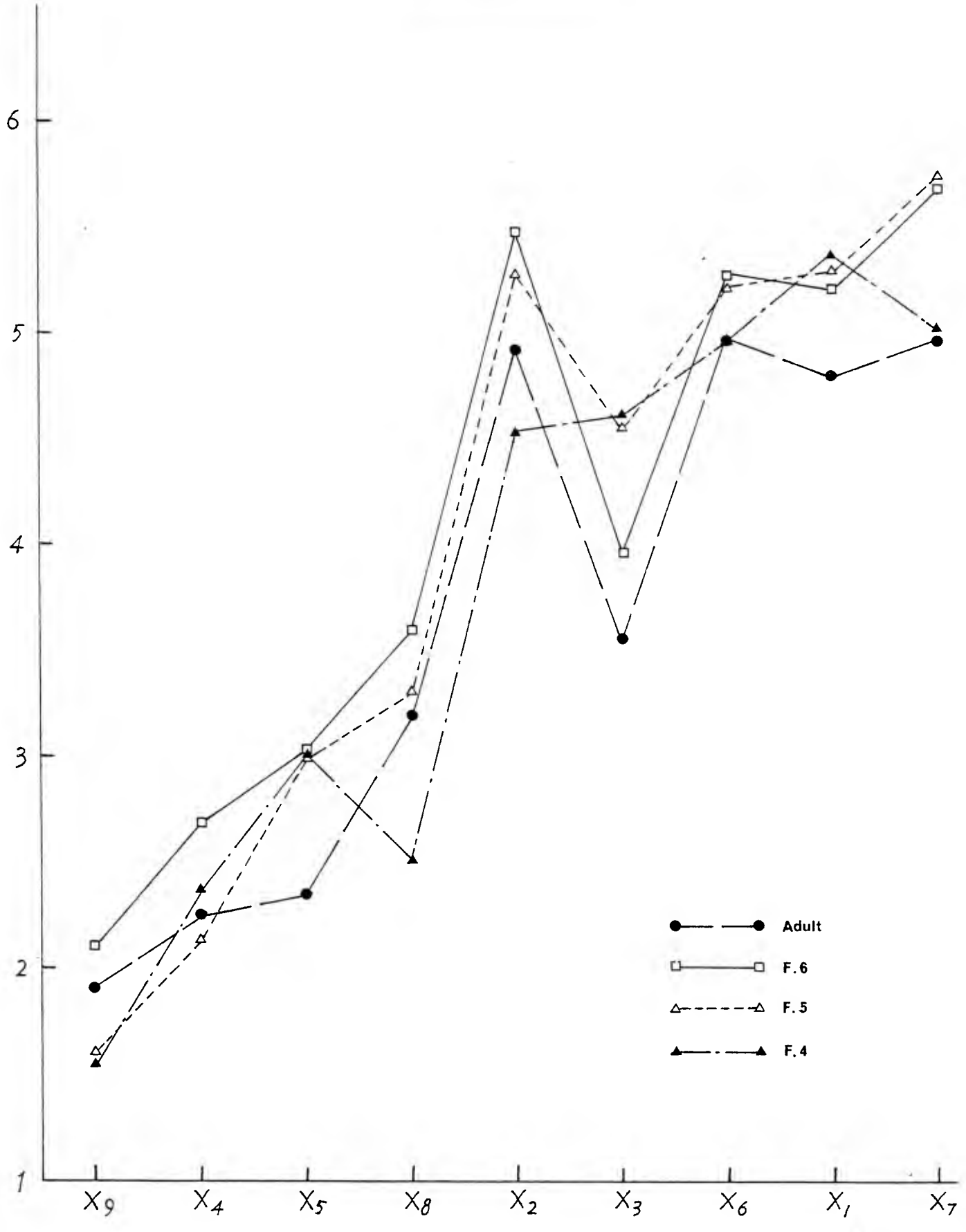


Figure A.6.5.1 (C) A Doctor's Dilemma

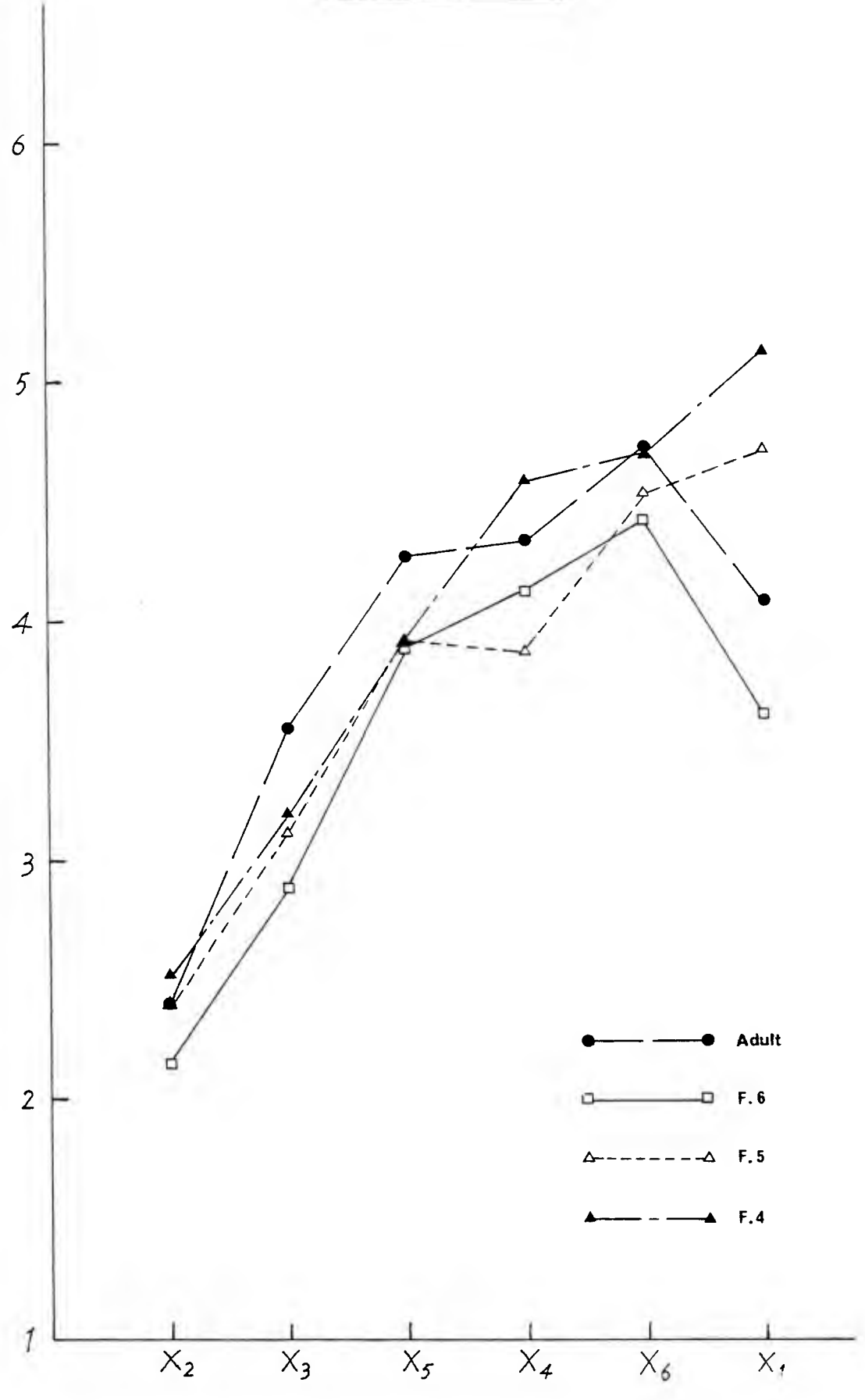


Figure A.6.5.1 (D) Car Accident

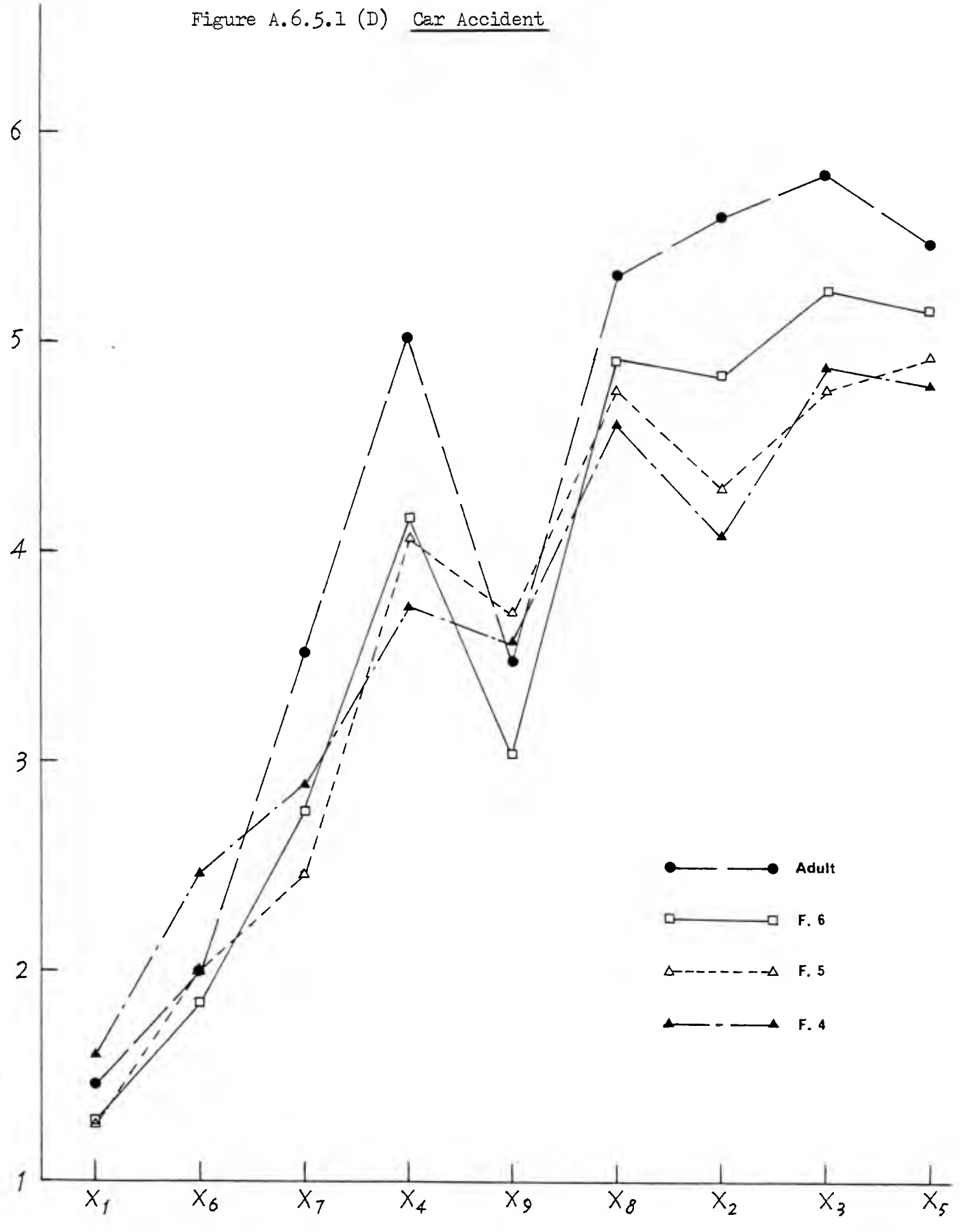
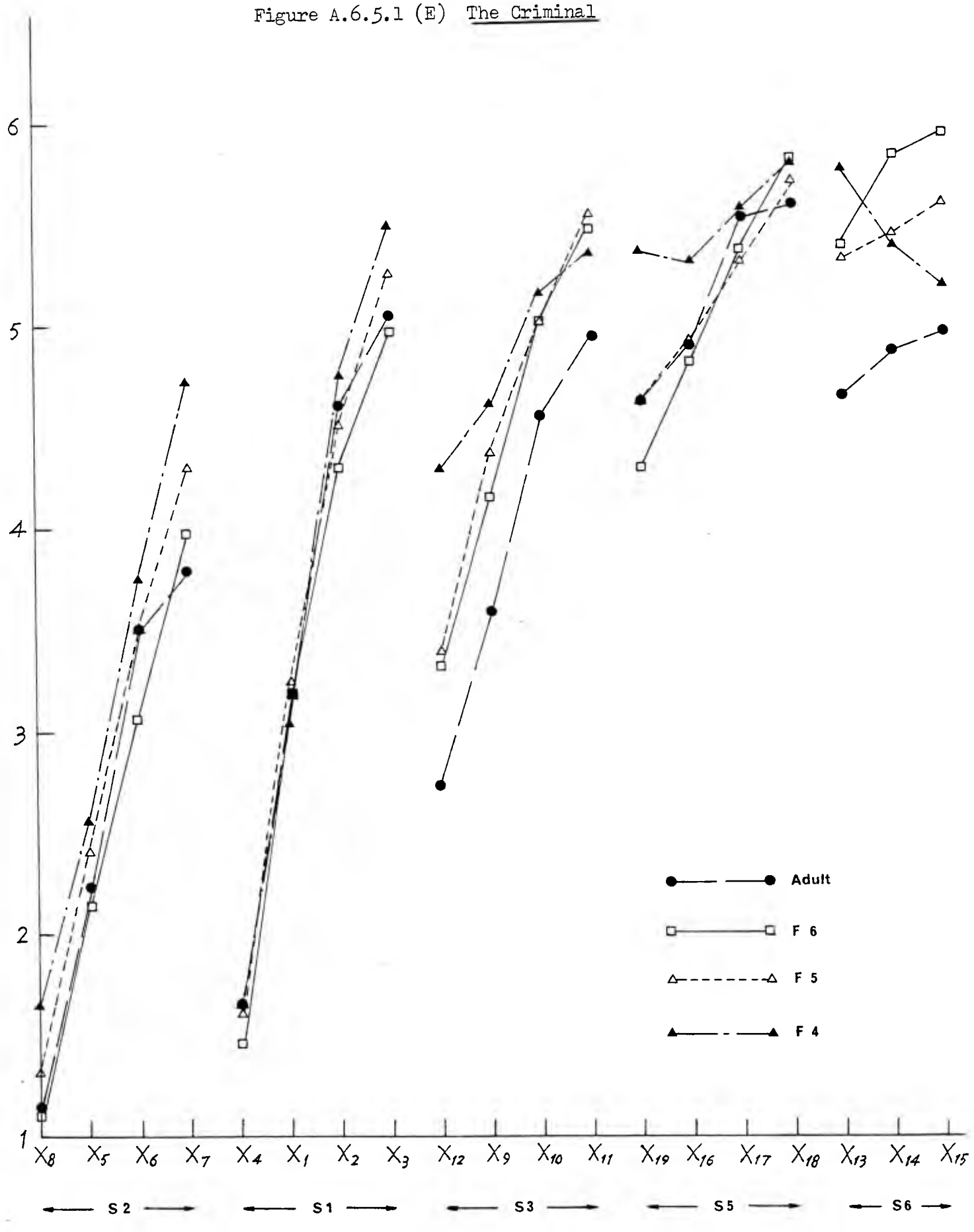


Figure A.6.5.1 (E) The Criminal



Appendix 6.5. (C) The Means and Standard Deviations of Some Important N-indices

	F.4		F.5		F.6		Adult	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
N16	4.05	1.35	3.68	1.19	3.68	1.22	4.10	1.29
N36	2.80	0.64	2.82	0.64	2.94	0.62	3.03	0.77
N415	4.26	0.87	4.21	0.78	4.05	0.84	3.91	0.84
N51	4.13	1.10	4.49	1.05	4.70	0.84	4.23	1.05
N31	2.35	1.00	1.96	0.92	2.40	0.75	2.21	0.78
N32	2.71	1.01	2.49	0.91	2.43	0.76	2.32	0.82
N33	3.59	1.34	4.21	1.41	4.41	1.34	4.39	1.10
N428	5.25	1.39	5.32	1.24	5.17	1.16	4.90	1.29
N429	4.83	1.27	4.63	1.09	4.49	1.10	4.36	1.24
N426	4.26	1.05	4.05	1.03	3.94	1.14	3.71	1.16
N427	3.23	0.90	2.72	1.07	2.54	0.89	2.54	0.96

TABLE A.6.5.3.

Note:

The sample consists of 25 F.4, 169 F.5, 38 F.6 and 25 adult subjects. The total N=257.

Appendix 6.5. (D) ONEWAY Analysis of Variance of the major MDT Indices

	EDUC				NR03				RJ03			
	O.M.	B.G.	Linear	Dev.	O.M.	B.G.	Linear	Dev.	O.M.	B.G.	Linear	Dev.
CTA		**		*	-	***	***		(-)	***	***	
CTB					+	***	***		+	***	***	
CTC					-	***	***		-	***	***	
CTD	(+)	*	*									
CTE					+	***	***		+	***	***	
N16					-	***	***		-	***	***	
N36					-	***	***		-	***	***	
N415					+	***	***		+	***	***	
N51					+	***	***		+	***	***	
J1	+	**	**									
J2					((-))	*	**		-	***	***	
J3					-	***	***		-	***	***	
J4					((+))	*	*		(+)	***	***	*
J5									+	***	***	
NR03					na	na	na	na	+	***	***	
RJ03					+	***	***		na	na	na	na
NRRJ03					+	***	***	***	+	***	***	*
WNRRJ03					+	***	***	***	+	***	***	*

TABLE A.6.5.4.

Notes:

(1) EDUC: (6) F.4 (7) F.5 (8) F.6 (9) Adult

(2) Significance: *$p \leq 0.05$ **$p \leq 0.01$ ***$p \leq 0.001$ na=not applicable

(3) Abbreviations used:
O.M.: Order of the Means
"+" means values increase from EDUC = 6 to EDUC = 9.
"-" decrease. Similarly defined for NR03 and RJ03.
( ) less clear order of the means (( )) least clear
B.G.: Between Groups
Linear: Linear term (i.e. linear trend analysis)
Dev.: Deviation from the linear term

(4) The details of the number of subjects (N) in each of the four or five groups classified by the variables EDUC, NR03 and RJ03 are as follows.

EDUC		NR03		RJ03	
Group No.	N	Group No.	N	Group No.	N
6	25	1	34	1	62
7	169	2	38	2	68
8	38	3	59	3	70
9	25	4	55	4	34
		5	71	5	23
Total	257		257		257

TABLE A.6.5.5.

(5) See also Section 6.2.5.(II) in the text for explanation of the classification of NR03 and RJ03. Roughly speaking, for the NR03 and RJ03 indices, sujects in Group (1) are at a higher stage of development than those in Group (2), and so on.

Appendix 6.5 (E) ANOVA of the Major MDT Indices by Age and Sex

The SPSS ANOVA was carried out for the major MDT indices by AGE (2,5) & SEX(1,2) using all the subjects from Schools C1 to C5. The classification of the variables AGE and SEX is same as those given in Section 6.2.7 of the text. It was found that all the F ratios are not significant at 5% level except CTA, CTB, CTD and N16 which are shown as follows:

Table A.6.5.6

	VARIANCE				
	Main effect	AGE	SEX	AGE x SEX	Explained
CTA	*		**		*
CTB	*		*		*
CTD		*			
N16	*		**		*

Notes:

(1) Significance of F: * $p \leq 0.05$ ** $p \leq 0.01$ *** $p \leq 0.001$

(2) The sample consists of 257 subjects from Schools C1 to C4, and 42 girls from School C5. The sex or age or both of 9 cases are unknown, thus the total N = 290 (122 male and 168 female subjects.)

(3) N for each age group are:
(2) 82 (3) 163 (4) 28 (5) 17.

Results of t-test by SEX (1,2) using the 257 subjects from Schools C1 to C4 can also be found in Microfiche (3).

APPENDIX 6.6 MALAYSIA STUDY

Appendix 6.6 (A) Internal Consistency Reliability (r_i)

	r_i	σ_i	σ_{meas}
CTA	0.844	1.374	0.543
CTB	0.871	1.019	0.366
CTC	0.646	1.024	0.609
CTD	0.813	0.851	0.368
CTE	0.939	1.125	0.278
N16	0.856	1.041	0.395
N36	0.725	0.705	0.370
N415	0.909	0.872	0.263
N51	0.650	0.958	0.567
NR03	0.856	3.784	1.436
J2	0.304	0.614	0.512
J3	0.410	0.430	0.330
J4	0.550	0.474	0.318
J5	0.554	0.417	0.279
RJ03	0.324	1.281	1.053
NRJ2	0.779	0.736	0.346
NRJ3	0.738	0.509	0.261
NRJ4	0.901	0.686	0.216
NRJ5	0.489	0.385	0.275
NRRJ03	0.962	4.417	0.861
WNRJ2	0.728	0.779	0.406
WNRJ3	0.726	0.577	0.302
WNRJ4	0.891	0.724	0.239
WNRJ5	0.503	0.495	0.349
WNRRJ03	0.954	4.831	1.036

TABLE A.6.6.1

Notes:

(1) The sample consists of 60 F.4 or F.6 subjects.

(2) Rejecting Criteria Used:
SELECT IF (MCTALL EQ 48 AND MJALL EQ 42)

(3) See also footnotes of Table 6.5 of the text.

(4) The r_i of NRRJ03 and WNRRJ03 calculated by treating the N and J-indices as variables are 0.838 and 0.805 respectively.

Appendix 6.6 (B) The Means and Standard Deviations of Some Important N-indices

	Mean	S.D.		Mean	S.D.		Mean	S.D.
N16	4.45	1.08	N31	1.81	0.77	N428	4.70	1.42
N36	2.80	0.69	N32	2.40	0.89	N429	3.89	1.14
N415	3.82	0.90	N33	3.37	1.27	N426	3.67	1.12
N51	4.38	1.03				N427	2.56	0.84

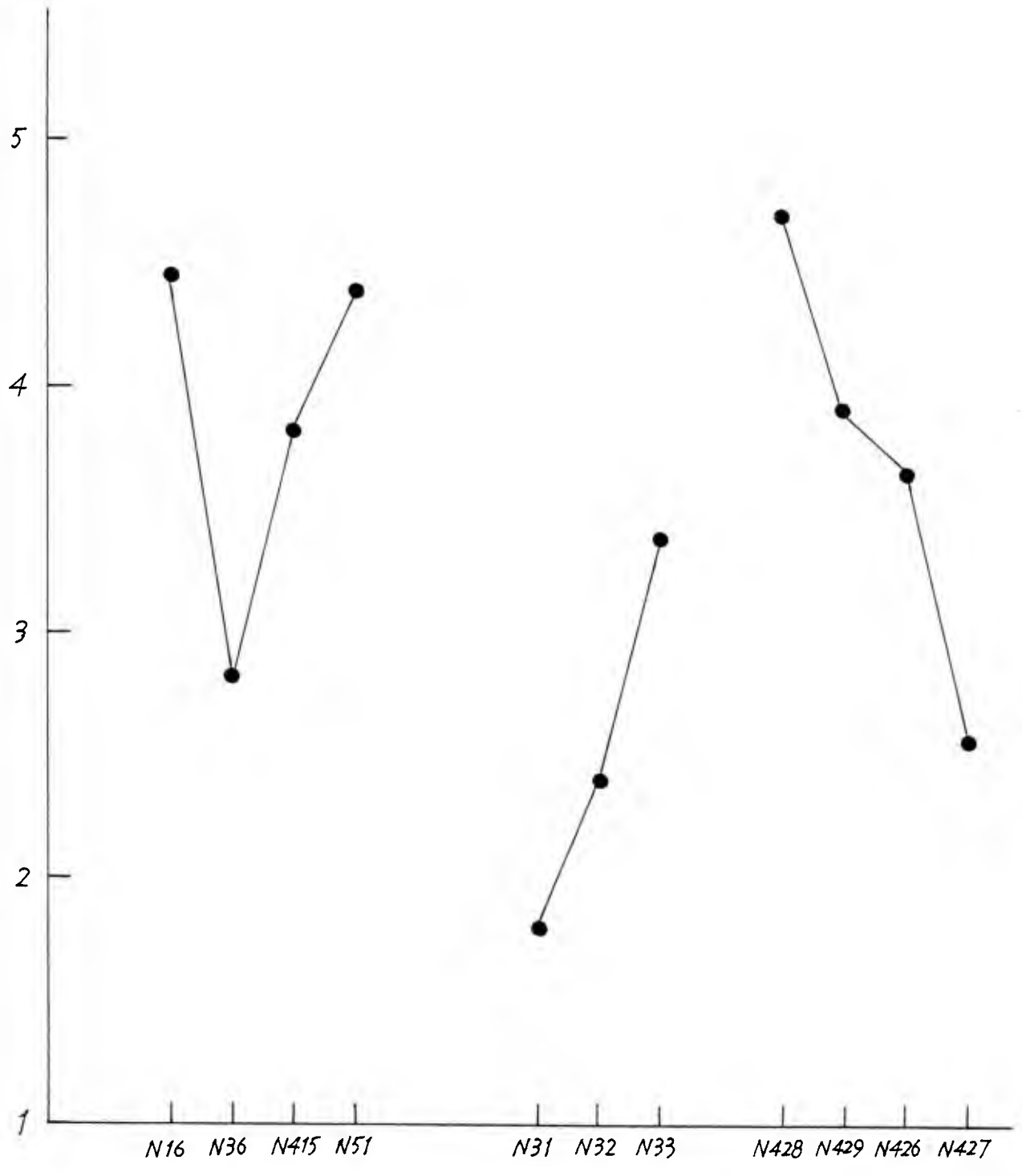
TABLE A.6.6.2

Notes:

(1) The sample consists of 83 F.4 or F.6 subjects.

(2) A graphical presentation of the above means is given in Figure A.6.6.1.

Figure A.6.6.1 Malaysia Study



APPENDIX 6.7.: Cross-cultual Analyses

Appendix 6.7. (A) A Comparative Study of the English, Chinese and Malaysian School-children

ANOVA was performed on the F.4 - F.6 groups of the English, Chinese and Malaysian samples.

TABLE A.6.7.1. A Cross-cultural Analysis of the English, Chinese and Malaysian School-children

	English		Chinese		Malaysian		F	P	
	Means	S.D.	Means	S.D.	Means	S.D.			
CTA	3.58	1.17	3.98	1.41	4.15	1.41	6.77	0.0013	**
CTB	4.32	1.25	4.28	1.21	3.43	1.05	18.49	0.0000	***
CTC	3.68	0.84	3.74	1.01	3.83	1.03	0.65	0.5249	
CTD	4.05	0.91	3.60	0.96	3.70	0.89	11.78	0.0000	***
CTE	4.30	1.15	4.29	0.96	3.76	1.10	8.80	0.0002	***
N16	3.54	1.16	3.72	1.21	4.45	1.08	17.50	0.0000	***
N36	2.86	0.74	2.84	0.64	2.80	0.69	0.22	0.8011	
N415	4.35	0.89	4.19	0.80	3.82	0.90	10.97	0.0000	***
N51	4.57	0.90	4.49	1.30	4.38	1.03	1.05	0.3517	
J1	3.08	1.03	3.29	0.76	2.98	0.82	5.15	0.0061	**
J2	2.96	0.73	3.18	0.60	2.72	0.64	16.56	0.0000	***
J3	2.69	0.57	2.63	0.54	2.61	0.49	0.88	0.4175	
J4	3.37	0.53	2.87	0.48	2.83	0.44	60.61	0.0000	***
J5	2.89	0.54	2.78	0.45	2.64	0.42	7.89	0.0004	***
NR03	4.21	3.10	3.77	3.65	2.51	4.05	6.53	0.0016	**
RJ03	0.81	1.53	0.00	1.50	0.17	1.36	15.44	0.0000	***
NRRJ03	5.02	3.95	3.77	4.56	2.68	4.80	8.78	0.0002	***
WNRRJ03	5.43	4.51	3.77	5.12	2.76	5.27	9.82	0.0001	***
AGE	15.97	1.12	17.23	1.02	18.53	0.67	191.90	0.0000	***

Notes:
(1) The sample consists 175 English, 232 Chinese and 83 Malaysian subjects. Total N = 490.

(2) Significance: *$p \leq 0.05$ **$p \leq 0.01$ ***$p \leq 0.001$

An analysis of covariance (ANCOVA) using the variable AGE as covariate was also performed on the above three sample groups. The results of ANCOVA are in general similar to those presented in Table A.6.7.1. The highly significant cross-cultural differences in the above analysis may probably be due to the special characteristics of the Malaysian Sample which consists of subjects from the top stream of three of the exceptionally competitive secondary schools in Malaysia. For further details of the Malaysian Sample, see Section 5.3.(III) of the text.

Appendix 6.7. (B) A Comparative Study of Adult Subjects from Different Countries

ANOVA was performed on the following three adult sample groups:

(1) English, N = 48

(2) Chinese, N = 25

(3) Other (most of them came from Malaysia and other developing countries), N = 15

It should be noted that Group (1) and (3) answered the English version of the MDT while Group (2) answered the Chinese version. Two Chinese subjects who took the English MDT in the London Study are not included in the above analysis.

TABLE A.6.7.2.

	F	P	
CTA	0.44	0.6434	
CTB	0.17	0.8471	
CTC	0.58	0.5648	
CTD	0.34	0.7128	
CTE	0.10	0.9084	
N16	0.35	0.7050	
N36	0.66	0.5173	
N415	0.43	0.6532	
N51	0.52	0.5987	
J1	0.30	0.7428	
J2	0.17	0.8478	
J3	6.46	0.0024	**
J4	12.78	0.0000	***
J5	3.55	0.0330	*
NRO3	0.37	0.6914	
RJO3	0.68	0.5120	
NRRJO3	0.22	0.8020	
WNRRJO3	0.21	0.8154	

Notes:
(1) Significance: *$p \leq 0.05$ **$p \leq 0.01$ ***$p \leq 0.001$

Contents of Microfiche (1)*

APPENDICES *6.2(E) TO 6.2(I)*: LONDON STUDY

APPENDIX 6.2(E): PEARSON CORRELATION: AGE WITH THE MDT ITEM RESPONSES

FL2,F,3,F,4,F,6 AND ADULT GROUPS

```
PEARSON CORR    AGE WITH AA01 TO AA06,BA01 TO BA08,CA01 TO CA06,DA01 TO DA09,
                EA01 TO EA19
STATISTICS      1
```

FL3,F,4,F,6 AND ADULT GROUPS

```
*REJECT IF      (ID GE 12001 AND ID LE 12200)
*REJECT IF      ((ID GE 13001 AND LE 18060) AND (MJALL LE 37 OR MJ2 LE 2 OR MJ3
                LE 7 OR MJ4 LE 9 OR MJ5 LE 12))
*REJECT IF      ((ID GE 86001 AND LE 86070) AND (MJALL LE 33 OR MJ2 LE 2 OR
                MJ3 LE 7 OR MJ4 LE 6 OR MJ5 LE 11))
PEARSON CORR    AGE WITH AA01 TO AA06,BA01 TO BA08,CA01 TO CA06,DA01 TO DA09,
                EA01 TO EA19,AC01 TO AC09,BC01 TO BC09,CC01 TO CC09,DC01 TO
                DC09,EC01 TO EC09
STATISTICS      1
```

APPENDIX 6.2(F): FACTOR ANALYSIS

PRINCIPAL COMPONENT ANALYSIS

```
FACTOR          VARIABLES=N16,N36,N415,N51/TYPE=PA1/NFACTORS=2/
STATISTICS      ALL

*REJECT IF      (ID GE 12001 AND ID LE 12200)
*REJECT IF      ((ID GE 13001 AND LE 18060) AND (MJALL LE 37 OR MJ2 LE 2 OR MJ3
                LE 7 OR MJ4 LE 9 OR MJ5 LE 12))
*REJECT IF      ((ID GE 86001 AND LE 86070) AND (MJALL LE 33 OR MJ2 LE 2 OR
                MJ3 LE 7 OR MJ4 LE 6 OR MJ5 LE 11))
FACTOR          VARIABLES=J2 TO J5/TYPE=PA1/NFACTORS=2/
STATISTICS      ALL
```

PRINCIPAL FACTORING WITH ITERATION

```
FACTOR          VARIABLES=N16,N36,N415,N51/NFACTORS=2/
STATISTICS      ALL

*REJECT IF      (ID GE 12001 AND ID LE 12200)
*REJECT IF      ((ID GE 13001 AND LE 18060) AND (MJALL LE 37 OR MJ2 LE 2 OR MJ3
                LE 7 OR MJ4 LE 9 OR MJ5 LE 12))
*REJECT IF      ((ID GE 86001 AND LE 86070) AND (MJALL LE 33 OR MJ2 LE 2 OR
                MJ3 LE 7 OR MJ4 LE 6 OR MJ5 LE 11))
FACTOR          VARIABLES=J2 TO J5/NFACTORS=2/
STATISTICS      ALL

*REJECT IF      (ID GE 12001 AND ID LE 12200)
*REJECT IF      ((ID GE 13001 AND LE 18060) AND (MJALL LE 37 OR MJ2 LE 2 OR MJ3
                LE 7 OR MJ4 LE 9 OR MJ5 LE 12))
```

*The SPSS computing procedures are reproduced here.

```
*REJECT IF      ((ID GE 86001 AND LE 86070) AND (MJALL LE 33 OR MJ2 LE 2 OR
                MJ3 LE 7 OR MJ4 LE 6 OR MJ5 LE 11))
FACTOR          VARIABLES=N16,N36,N415,N51,J2 TO J5/NFACTORS=3/
STATISTICS      ALL
```

APPENDIX 6.2(G): PEARSON CORRELATION: AGE WITH THE MDT INDICES

FL2 AND ADULT GROUPS

```
*SELECT IF      (EDUC EQ 1 OR 5)
PEARSON CORR    AGE,NR03 WITH AGE,CTA TO CTE,N16,N36,N415,N51
STATISTICS      ALL
```

FL3 AND ADULT GROUPS

```
*SELECT IF      (EDUC EQ 2 OR 5)
*REJECT IF      (ID GE 12001 AND ID LE 12200)
*REJECT IF      ((ID GE 13001 AND LE 18060) AND (MJALL LE 37 OR MJ2 LE 2 OR MJ3
                LE 7 OR MJ4 LE 9 OR MJ5 LE 12))
*REJECT IF      ((ID GE 86001 AND LE 86070) AND (MJALL LE 33 OR MJ2 LE 2 OR
                MJ3 LE 7 OR MJ4 LE 6 OR MJ5 LE 11))
PEARSON CORR    AGE,NR03,RJ03,NRRJ03,WNRRJ03 WITH AGE,CTA TO CTE,N16,N36,
                N415,N51,J1 TO J5,NR03,RJ03/
                AGE,CTA TO CTE,N16,N36,N415,N51,J1 TO J5/
STATISTICS      ALL
```

APPENDIX 6.2(H): PEARSON CORRELATION: MDT RATINGS WITH MDT RANKINGS

```
*REJECT IF      (MRANKIT LE 11 OR MRANKI1 LE 1 OR MRANKI2 LE 2 OR MRANKI3 LE 1
                OR MRANKI4 LE 2)
*REJECT IF      (CON126 EQ 9 OR 0)
PEARSON CORR    AGE,NR03 WITH TRC1234,TRCALL,SNALL
STATISTICS      ALL

*REJECT IF      (ID GE 12001 AND ID LE 12200)
*REJECT IF      ((ID GE 13001 AND LE 18060) AND (MJALL LE 37 OR MJ2 LE 2 OR MJ3
                LE 7 OR MJ4 LE 9 OR MJ5 LE 12))
*REJECT IF      ((ID GE 86001 AND LE 86070) AND (MJALL LE 33 OR MJ2 LE 2 OR
                MJ3 LE 7 OR MJ4 LE 6 OR MJ5 LE 11))
*REJECT IF      (CON126 EQ 9 OR 0)
*REJECT IF      (MRANKIIT LE 12 OR MRANKII1 LE 1 OR MRANKII2 LE 1 OR MRANKII3
                LE 1 OR MRANKII4 LE 1 OR MRANKII5 LE 1)
*REJECT IF      (ID EQ 13025 OR 13034 OR 13042 OR 14003 OR 14087 OR 18009 OR
                18031 OR 18046 OR 86014 OR 86026 OR 86037 OR 86045 OR 86064)
*COMPUTE        RANKP=RANKP1
*COMPUTE        RANKR=RANKR1
PEARSON CORR    AGE,CTA TO CTE,N16,N36,N415,N51,J1 TO J5,NR03,RJ03,NRRJ03,WNRRJ03
                WITH AGE,RANKJ1 TO RANKJ6,RANKP,RANKR
STATISTICS      ALL
```

APPENDIX 6.2(I): VALIDITY STUDY

FORM 2 GROUP

```
*SELECT IF      (EDUC EQ 1)
PEARSON CORR    AGE,CTA TO CTE,N16,N36,N415,N51,NR03 WITH AGE,MMS TO TT
STATISTICS      ALL
```

FORM 3 AND FORM 4 GROUPS

```
*SELECT IF      (EDUC EQ 2 OR 3)
*REJECT IF      (ID GE 12001 AND ID LE 12200)
*REJECT IF      ((ID GE 13001 AND LE 18060) AND (MJALL LE 37 OR MJ2 LE 2 OR MJ3
                LE 7 OR MJ4 LE 9 OR MJ5 LE 12))
*REJECT IF      ((ID GE 86001 AND LE 86070) AND (MJALL LE 33 OR MJ2 LE 2 OR
                MJ3 LE 7 OR MJ4 LE 6 OR MJ5 LE 11))
PEARSON CORR    AGE,CTA TO CTE,N16,N36,N415,N51,J1 TO J5,NR03,RJ03,NRRJ03,
                WNRRJ03 WITH AGE,MMS TO TT
STATISTICS      ALL
```

PARTIAL CORRELATION CONTROLLING FOR THE AGE EFFECT

FORM 2, FORM 3 AND FORM 4 GROUPS

```
PARTIAL CORR    MMS WITH CTA TO CTE,N16,N36,N415,N51,NR03 BY AGE(1)/
                JEPIE,JEPIN,JEPIL WITH CTA TO CTE,N16,N36,N415,N51,NR03
                BY AGE(1)/
                RPM WITH CTA TO CTE,N16,N36,N415,N51,NR03 BY AGE(1)/
                SRT WITH CTA TO CTE,N16,N36,N415,N51,NR03 BY AGE(1)/
                TT  WITH CTA TO CTE,N16,N36,N415,N51,NR03 BY AGE(1)/
OPTIONS         2
STATISTICS      3
```

FORM 2 GROUP

```
*SELECT IF      (EDUC EQ 1)
PARTIAL CORR    MMS WITH CTA TO CTE,N16,N36,N415,N51,NR03 BY AGE(1)/
                JEPIE,JEPIN,JEPIL WITH CTA TO CTE,N16,N36,N415,N51,NR03
                BY AGE(1)/
                RPM WITH CTA TO CTE,N16,N36,N415,N51,NR03 BY AGE(1)/
                SRT WITH CTA TO CTE,N16,N36,N415,N51,NR03 BY AGE(1)/
                TT  WITH CTA TO CTE,N16,N36,N415,N51,NR03 BY AGE(1)/
OPTIONS         2
STATISTICS      3
```

FORM 3 AND FORM 4 GROUPS

```
*SELECT IF      (EDUC EQ 2 OR 3)
*REJECT IF      (ID GE 12001 AND ID LE 12200)
*REJECT IF      ((ID GE 13001 AND LE 18060) AND (MJALL LE 37 OR MJ2 LE 2 OR MJ3
                LE 7 OR MJ4 LE 9 OR MJ5 LE 12))
*REJECT IF      ((ID GE 86001 AND LE 86070) AND (MJALL LE 33 OR MJ2 LE 2 OR
                MJ3 LE 7 OR MJ4 LE 6 OR MJ5 LE 11))
PARTIAL CORR    MMS WITH CTA TO CTE,N16,N36,N415,N51,J1 TO J5,NR03,RJ03,NRRJ03,
                WNRRJ03 BY AGE(1)/
                JEPIE,JEPIN,JEPIL WITH CTA TO CTE,N16,N36,N415,N51,J1 TO J5,
                NR03,RJ03,NRRJ03,WNRRJ03 BY AGE(1)/
                RPM WITH CTA TO CTE,N16,N36,N415,N51,J1 TO J5,NR03,RJ03,NRRJ03,
                WNRRJ03 BY AGE(1)/
                SRT WITH CTA TO CTE,N16,N36,N415,N51,J1 TO J5,NR03,RJ03,NRRJ03,
                WNRRJ03 BY AGE(1)/
                TT  WITH CTA TO CTE,N16,N36,N415,N51,J1 TO J5,NR03,RJ03,NRRJ03,
                WNRRJ03 BY AGE(1)/
OPTIONS         2
STATISTICS      3
```

Contents of Microfiche (2)

APPENDIX *6.2(J)*:MDT - DIT STUDY

PRINCIPAL COMPONENT ANALYSIS

```
FACTOR          VARIABLES=N16,N36,N415,N51/TYPE=PA1/NFACTORS=2/
STATISTICS      ALL

FACTOR          VARIABLES=J2 TO J5/TYPE=PA1/NFACTORS=2/
STATISTICS      ALL

FACTOR          VARIABLES=N16,N36,N415,N51,J2 TO J5/TYPE=PA1/NFACTORS=3/
STATISTICS      ALL

FACTOR          VARIABLES=DJ2,DJ3,DJ4,DJ5/TYPE=PA1/NFACTORS=2/
STATISTICS      ALL

FACTOR          VARIABLES=J2 TO J5,DJ2,DJ3,DJ4,DJ5/TYPE=PA1/NFACTORS=3/
STATISTICS      ALL


FACTOR          VARIABLES=J2 TO J5,DJ2,DJ3,DJ4,DJ5,N16,N36,N415,N51/
                TYPE=PA1/NFACTORS=3/
STATISTICS      ALL

FACTOR          VARIABLES=J2 TO J5,DJ2,DJ3,DJ4,DJ5,N16,N36,N415,N51/
                TYPE=PA1/NFACTORS=4/
STATISTICS      ALL
```

PARTIAL CORRELATION CONTROLLING FOR THE AGE EFFECT: MDT WITH DIT

```
PARTIAL CORR    DRJ03 WITH NR03,RJ03,NRRJ03,WNRRJ03 BY AGE(1)/
                DJ1 TO DJ4,DJ5,DRJ03 WITH CTA TO CTE,N16,N36,N415,N51,NR03,
                J1 TO J5,RJ03,NRRJ03,WNRRJ03 BY AGE(1)/
OPTIONS         2
STATISTICS      ALL

*REJECT IF      (CONSI26 EQ 9 OR 0)
*REJECT IF      (MRANKIIT LE 12 OR MRANKII1 LE 1 OR MRANKII2 LE 1 OR MRANKII3
                LE 1 OR MRANKSI4 LE 1 OR MRANKII5 LE 1)
*REJECT IF      (ID EQ 13025 OR 13034 OR 13042 OR 14003 OR 14087 OR 18009 OR
                18031 OR 18046 OR 86014 OR 86026 OR 86037 OR 86045 OR 86064)
*REJECT IF      (DITCON28 EQ 9 OR 0)
*REJECT IF      (ID EQ 13061 OR 13089 OR 18045)
*COMPUTE        DITP=DITP2
*COMPUTE        RANKP=RANKP2
*COMPUTE        RANKR=RANKR2
PARTIAL CORR    DITP,DITD,DRJ03 WITH NR03,RJ03,NRRJ03,WNRRJ03,TRC1234,TRCALL,
                SNALL,RANKP,RANKR BY AGE(1)/
OPTIONS         2
STATISTICS      ALL
```

Contents of Microfiche (3)

APPENDIX *6.5* : HONG KONG STUDY

FACTOR ANALYSIS

PRINCIPAL COMPONENT ANALYSIS

```
FACTOR          VARIABLES=N16,N36,N415,N51/TYPE=PA1/NFACTORS=2/
STATISTICS      ALL

FACTOR          VARIABLES=J2 TO J5/TYPE=PA1/NFACTORS=2/
STATISTICS      ALL

FACTOR          VARIABLES=N16,N36,N415,N51,J2 TO J5/TYPE=PA1/NFACTORS=3/
STATISTICS      ALL
```

PRINCIPAL FACTORING WITH ITERATION

```
FACTOR          VARIABLES=N16,N36,N415,N51/NFACTORS=2/
STATISTICS      ALL

FACTOR          VARIABLES=J2 TO J5/
                NFACTORS=2/
STATISTICS      ALL

FACTOR          VARIABLES=N16,N36,N415,N51,J2 TO J5/NFACTORS=3/
STATISTICS      ALL
```

PEARSON CORRELATION: AGE WITH THE MDT INDICES

```
PEARSON CORR    AGE,NR03,RJ03,NRRJ03,WNRRJ03 WITH AGE,CTA TO CTE,N16,N36,
                N415,N51,J1 TO J5,NR03,RJ03/
                AGE,CTA TO CTE,N16,N36,N415,N51 WITH AGE,J1 TO J5/
STATISTICS      ALL
```

THE ORDER OF SOME IMPORTANT N-INDICES: SN- AND TRC-ANALYSES

```
CROSSTABS       VARIABLES=EDUC(6,9),SN01(0,2),SN02(0,2),SN03(0,3)/
                TABLES=EDUC BY SN01/EDUC BY SN02/EDUC BY SN03/
STATISTICS      ALL

*REJECT IF      (ID EQ 24301 OR 24302 OR 24307 OR 24310 OR 24314 OR 24315 OR
                24327 OR 25206 OR 25207 OR 25211 OR 25214 OR 25257 OR 25259 OR
                25268 OR 25269 OR 25272 OR 25290 OR 25292 OR 26312 OR 25112 OR
                25129 OR 25158 OR 25162 OR 25165)
*REJECT IF      (MRANKIT LE 8 OR MRANKI1 LE 1 OR MRANKI2 LE 2 OR MRANKI4 LE 2)
PEARSON CORR    AGE,NR03 WITH TRC01,TRC02,TRC04,TRC05,SN01 TO SN03,SNALL/
STATISTICS      ALL
```

THE MDT RANKINGS

```
*REJECT IF      (ID EQ 24302 OR 24305 OR 24307 OR 24312 OR 24316 OR 24317 OR
                24320 OR 24322 OR 24324 OR 24329 OR 25230 OR 25251 OR 25252 OR
                25269 OR 25279 OR 25283 OR 25290 OR 25293 OR 26311 OR 26312 OR
                26315 OR 25102 OR 25103 OR 25113 OR 25129 OR 25134 OR 25153 OR
                25155 OR 25162 OR 25164 OR 25166 OR 28403)
*REJECT IF      (MRANKII1 LE 12 OR MRANKII1 LE 1 OR MRANKII2 LE 1 OR MRANKII3
                LE 1 OR MRANKII4 LE 1 OR MRANKII5 LE 1)
*COMPUTE        RANKP=RANKP2
*COMPUTE        RANKR=RANKR2
PEARSON CORR    AGE,N16,N36,N415,N51,J1 TO J5,NR03,RJ03,NRRJ03,WNRRJ03
                WITH AGE,RANKJ1 TO RANKJ6,RANKP,RANKR
STATISTICS      ALL
```

THE EFFECT OF SEX ON THE MDT INDICES

```
T-TEST          GROUPS=SEX(1,2)/VARIABLES=CTA TO CTE,N16,N36,N415,N51,J1 TO J5,
                NR03,RJ03,NRRJ03,WNRRJ03
STATISTICS      ALL
```