Manual for the

MEYER INTEREST QUESTIONNAIRE (MB-10)

and

Structured Vocational Guidance

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PREFACE

Test users should take note that

- ❑ the MEYER-INTEREST QUESTIONNAIRE (MB-10) has been classified as a **psychological test** by the *Psychometrics Committee of the Professional Board for Psychology* in September 2000.

  Therefore the MB-10 can be:

  - ▪ **administered** by a psychologist/psychometrist/psychotechnician under supervision of a registered psychologist
  - ▪ **scored by** a psychologist/psychometrist/psychotechnician under supervision of a registered psychologist
  - ▪ **interpreted** by a psychologist/psychometrist (provisionally)
  - ▪ **reported** on by a psychologist

- ❑ The MB-10 is **applicable to:**

  - ▪ learners and students who are proficient in either the English - or Afrikaans language
  - ▪ educational and career decision making in grades 7, 9 and 11, and on entering tertiary education

[as the nature of the test content and/or information obtained from the test is such that it does NOT potentially have an adverse psychological impact on the test-taker, the MB-10 may also, with appropriate judgement, be used for other high school or adult groups. In such cases the raw scores and the closest norm group should be considered.]

- ❑ the normative sample of the MB-10 is **limited** as regards:

  - ▪ geographic area (as only learners and students in the Southern and Western Cape were included)
  - ▪ only students from one university were included

Die normative sample can thus not be considered to be nationally representative.

- ❑ My use of apartheid terminology such as white, black and "coloured" does not reflect an endorsement of such terminology, but acknowledges the reality that apartheid has affected people in ways that are both profound and longlasting.

Johann Meyer September 2003

1.   **INTRODUCTION**

1.1   **Background**

The Meyer Interest Questionnaire, consisting of ten fields, referred to hereafter as the MB-10, evolved from the Kodus Interest Questionnaire (Meyer, 1980).

Taking into account the dynamic nature of the world of work, as well as the large-scale socio-political changes in South Africa since 1980, the Kodus was due for revision. The need was subsequently realised for a shorter interest-measuring instrument that allows for simple economic administration, easy interpretation and universal use on all population groups.

It was decided to use the same format, rationale and broad content of the scientifically standardised, and already proven, Kodus Interest Questionnaire. Eight of the original twelve Kodus interest fields were retained and two new fields, namely **Linguistic** and **Practical,** were added. The **Write** and **Read** interest fields, and the **Handwork** and **Machine-work** interest fields of the Kodus were combined to form the two new above mentioned MB-10 fields respectively.

Subsequently (Meyer, 1993) all the items were revised, rewritten or replaced in order to be representative of the various occupational areas. Furthermore, items had to be as short and as clear as possible and they needed to fall within the comprehension and experience worlds of the various norm groups. A few items underwent further simplification during the standardisation on the grade seven groups.

1.2   **Purpose of the Questionnaire**

The MB-10 was orginally compi1ed to measure the interest of grade 9 and grade 11 learners and first year university students (Meyer, 1993). The questionnaire may be used at grade 9 level as an aid to provide guidance to learners and their parents concerning the choice of subjects for the senior standards. At grade 11 and higher levels it may be used in the same way to guide learners and students in their choice of after-school subjects courses and/or careers.

As a result of the radical changes that have been brought about within the South African education system since 1994, it is now possible for grade 7 learners to make decisions regarding their educational future, in terms of the type of school (eg. a technically or academically orientated school) they wish to attend when they leave primary school. This choice, which will be greatly influenced by the learner's interest, will naturally have a significant influence on the learner's future career path (Meyer, 1998). Within the South African context, only Meyer (1980) and later Beytell (1984) have conducted research on the interest of grade 7 learners, and then only amongst White learners. Both researchers found that the interest of grade 7 learners have developed sufficiently to be tested and used in practise within the career guidance process. Due to the gap that exists regarding standardised interest questionnaires for grade 7 learners, the Kodus (Meyer, 1980) has, until recently, still been applied to measure the interest of grade 7 learners in the Western Cape, even though it has not been standardised for this population (Wium, 2001). There is therefore a need for a standardised interest questionnaire for grade 7 learners.

Since the MB-10 has been standardised for grade 9 and grade 11 learners (Meyer, 1993), it seemed obvious that the next step would be to standardise this interest-measuring instrument amongst grade 7 learners. This updated version of the MB-10 therefore makes it possible for learners, as early as grade 7, to receive future orientated career guidance, with the results based upon scientific research.

1.3   Interest

Interest can be defined as a tendency to favour certain types of activities in a relatively constant manner. As a motivating force it can play a conscious or unconscious role in the decision making process. It is the orientation of the individual in his or her totality and if it is not taken into consideration when a career is chosen, it can have a far-reaching negative effect on the well-being of the individual.

The practical motivation principle of this definition is that the best reason for someone to do anything, is to want to do it.

1.4   Rationale

The questionnaire includes an equal number of items representative of ten interest fields (36x10) which correspond to general occupational categories. The number of times that a person prefers the items representative of one field of interest instead of any one of the others, is an indication of his or her interest in that particular field. The rank order and inter-relationship of the ten fields of interest are also determined in the process.

1.5   The Fields of Interest

In the description of each field of interest a symbol, a short definition and an explanation of the contents of the items are given. To facilitate the interpretation of the results, a few careers that are normally associated with a high score (above the 70th percentile or high in raw score rank order) in a particular field, are given.

1.5.1   In = Preference for working with people as individuals or with small groups of people.

The items are divided as follows:

To be involved with people in a humanitarian manner	28%
To study human behaviour	22%
To counsel, advise people	17%
To conduct interviews	11%
To mix with people socially	11%
To educate people	<u>11%</u>
	100%

Examples of careers in which *In* will be the most important interest component, are those of psychologist and social worker. Examples of careers in which *In* plays an important role in combination with other fields of interest, are those of nurse, medical doctor, teacher and missionary.

1.5.2   Gr = Preference for public appearance and working with groups of people.

The items are divided as follows:

To be a public speaker	36%
To be a leader of a group	17%
To appear on radio or television	14%
To conduct courses and use one's powers of persuasion	14%
To appear in court, to entertain strangers	11%
To amuse people e.g. actor/actress	8%
	100%

An example of a career in which *Gr* will be the main interest component, is that of politician. Examples of careers in which *Gr* plays an important part in combination with other fields of interest, are those of advocate, television presenter and clergyman.

1.5.3   B = Preference for business activities

The items are divided as follows:

Buying and selling	28%
Management/Development of business enterprises	17%
Investing, making a profit	17%
Having theoretical commercial knowledge	16%
Marketing	11%
To be a businessman	11%
	100%

Examples of careers in which *B* is the most important interest component, are those of businessman and economist. Examples of careers in which *B* plays an important part in combination with other fields of interest, are those of estate agent, marketing manager, financial advisor, auctioneer and sales representative.

1.5.4   Nu = Preference for working with figures

The items are divided as follows:

To do a variety of practical computations	53%
Financial accountancy and bookkeeping	11%
Mathematics	11%
To solve arithmetical problems	11%
To do general figure work	8%
Ordinary arithmetic (e.g. paying out money)	6%
	100%

An example of a career in which *Nu* will be the most important interest component, is that of statistician. Examples of careers in which *Nu* plays an important part in

combination with other fields of interest, are those of land surveyor, quantity surveyor and pay clerk. A key to the interpretation of this field of interest can often be found in the strongest supporting interest. If it is *B* it can indicate interest in a career such as that of accountant. In the case of *Sc* it can indicate careers such as mathematician or physicist.

1.5.5 L = Linguistic preference. Preference for reading and writing.

The items are divided as follows:

To do a variety of reading	31%
To have knowledge of literature	14%
To visit book shops and libraries	8%
To write journalistic articles	19%
To do business and information writing	14%
To write letters, stories, etc.	<u>14%</u>
	100%

Apart from the total score in this field, it is possible to determine separate raw scores for the reading as well as the writing subdivisions. There are 16 reading and 20 writing items. The writing items are those on the left side of the column (5) on the answer sheet.

Examples of careers where *L* will be the most important interest component, are those of proof-reader and translator. Examples of careers in which *L* plays an important role in combination with other fields of interest, are those of secretary and publisher.

1.5.6 A = Artistic preference or preference for art and art appreciation.

The items are divided as follows:

To be an artist, painter, sculptor and wood-engraver	22%
Theoretical study of art and artists	22%
Illustrating and decorating	20%
To appreciate art, own or select art objects	14%
Designing	11%
Drawing: cartoons, free-hand drawing	<u>11%</u>
	100%

An example of a career in which *A* will be the main interest component, is that of artist or painter. Examples of careers in which *A* will play an important role in combination with other fields of interest, are those of architect, photographer, art critic and graphic designer.

1.5.7   **Pr = Preference for practical work (handicraft and machines / machine-work).**

The items are divided as follows:

Machine work: general, maintenance, repair, design, invent, study, own, exhibit	53%
Handicraft: general, working with hand-tools, repair work, building models, making toys	<u>47%</u>
	100%

Apart from the total score in this field, it is possible to determine separate raw scores for the machine-work as well as the handwork subdivisions. There are 19 machine-work items and 17 handwork items. The handwork items are on the left side of the column (7) on the answer sheet.

Examples of careers in which *Pr* will be the main interest component, are those of carpenter, bricklayer, dress-maker, mechanic and machine operator. Examples of careers in which *Pr* plays an important part in combination with other fields of interest, are those of engineer, physiotherapist, occupational therapist and television technician.

Items in this field are often phrased in such a way as to offer separate options for both sexes, e.g. to do woodwork/needlework.

1.5.8   **Sc = Preference for the natural sciences and work of a physical scientific nature.**

The items are divided as follows:

General scientific laboratory work; conducting experiments	33%
Scientific research	17%
Physics	14%
Theoretical (e.g. to meet, visit, or watch a scientist at work, teaching)	11%
Chemistry	11%
Geology and geography	8%
Astronomy	<u>6%</u>
	100%

Examples of careers in which *Sc* will be the main interest component, are those of chemist and a physicist. Examples of careers in which *Sc* play an important role in combination with other fields of interest, are those of pharmacist, chemical engineer and geologist.

1.5.9   Z = Preference for animals, zoology and related biological scientific work.

The items are divided as follows:

Theoretical (to study, observe, know animals)	27%
Biological scientific work	25%
General practical work with animals	25%
Birds, fish and insects	17%
Microbiology	6%
	100%

An example of a career in which **Z** will be the main interest component, is that of veterinary surgeon or animal welfare official. Examples of careers in which **Z** plays an important role in combination with other fields of interest, are those of medical technologist and biology teacher.

1.5.10   P = Preference for plants, botanical and horticultural work.

The items are divided as follows:

To grow plants	28%
Botany (research)	19%
Working with plants in general	19%
Theoretical (reading/course about plants, studying/having knowledge about plants)	19%
Horticulture	15%
	100%

Examples of careers in which **P** will be the main interest component, are those of nurseryman, botanist and horticulturist. Examples of careers in which **P** play an important role in combination with other fields of interest, are those of grain farmer or a fruit-farmer, nature conservationist and florist.

2.   TEST MATERIAL

2.1   Questionaire

Available online for students on the intranet

2.2   Results

Available online for the psychologist/psychometrist on the intranet

2.3   Manual

Available as a downloadable pdf document from the intranet (Afrikaans and English)

3. STANDARDISATION

3.1 Model

Originally, the MB-l0 started as a project to revise items of the Kodus Interest Questionnaire. However, it was evident that, in spite of the wide scientific standardisation of the Kodus and its high reliability coefficient, the questionnaire was just too long. It consists of 660 items and takes younger learners an hour or longer to complete. It was therefore decided to reduce the MB-l0 to ten fields (instead of twelve as in the Kodus). The same regulated model of the Kodus, namely putting each field once against every combination of two other fields, was again used in the MB-10. With ten fields it results in 120 combinations and 36 items per field. The questionnaire was hereby reduced to nearly half its original length, consisting of 360 items (10x36 or 120x3). The complete model is given later on in the manual.

3.2 Item Selection

The first step in the selection of items was to choose the 36 best items, that is, those items with the highest reliability indexes, in each of the eight fields of the Kodus. For the remaining two MB-10 fields, the 18 best items in four Kodus fields were chosen.

At this stage the field names for the first eight fields, namely *So (In)*, *Op (Gr)*, *B (B)*, *Sy (Nu)*, *K (A)*, *W (Sc)*, *D (Z)* and *P (P)*, were the same in both questionnaires (the abbreviations in brackets refer to the MB-10 equivalent of the Kodus abbreviations), while the Linguistic *(L)* field was compiled from *Sk* and *L* of the Kodus and the Practical *(Pr)* field was a combination of the two Kodus fields *H* and *M*.

With the existing items of the Kodus as the foundation, the following guidelines were laid down for the MB-10:

- the questionnaire must be such that it can be used by all population groups. Thus, the items must be within the comprehension spheres of all participants;

- items must be as short and as clear as possible without the questionnaire being a boring, unimaginative repetition of field names;

- the items must reflect the dynamics of the world of work;

- items in each combination of the questionnaire must be comparable regarding status, duration and effort connected to the activity or career;

- there must be no doubt about the face validity of any item (a panel of skilled counselling psychologists were helpful in this regard);

- the Afrikaans and English versions of the questionnaire must be as reconcilable as possible; and

- both sexes must be catered for in the selection of items.

4. STANDARDISATION OF THE MB-10 FOR GRADE 9 AND GRADE 11 LEARNERS AND FIRST YEAR UNIVERSITY STUDENTS (Meyer, 1993)

4.1 Sample and Application

The experimental subjects consisted of 776 grade 9 learners, 788 grade 11 learners and 1913 first year university students. The learners were drawn from Southern and Western Cape schools. The proportion of boys and girls was more or less 50/50 and the proportion of Afrikaans-/English-speaking learners more or less 40/60. Nearly half of the learners were drawn from "coloured" and black schools, while the rest were whites.

The first year student group consisted of the total group of first year students who did the first year testing at the University of Stellenbosch in 1991. The proportion male/female was 55/45.

The questionnaire was applied on the above experimental subjects during the first (students), second and third terms (scholars) of 1991.

4.2 Reliability coefficients and item analysis

Reliability coefficients of $r \geq 0,65$ for the various fields of interest were regarded as acceptable. These acceptable values were, with a few exceptions, obtained for all male and female subjects of both language groups (Table 2). The only fields that did not comply with the set requirement were the *Pr*- and *A*-fields in the case of the black girls and the *In*- and *A*-fields in the case of black boys. One of the problems was that these learners did not understand certain words in the English version of the questionnaire. Instead of changing these items, it was decided to include an explanatory vocabulary list at the back of the booklet, which learners can consult while answering the questionnaire. The reason for this is that changes to individual items in a questionnaire that is reliable as a whole, do not necessarily result in an overall improvement of its reliability.

As the number of items are based on a predetermined model, individual items cannot merely be excluded. This would lead to an unequal number of items in the different fields, with the result that it would not be possible to compare all the fields on an equal footing. Hence, one of the major advantages of the questionnaire, the rank order comparability of the raw scores, would be lost.

An item analysis of the results of 16 groups (4 main groups, subdivided into 4 groups each) with regard to all ten fields of the questionnaire, was done (Table 2). On the basis of the general results, the Afrikaans- and English experimental versions of the MB-10 were accepted as the final versions of the questionnaire. These results are fully reported in this manual.

4.3 Norms

The results of the above-mentioned application made the calculation of norms for "coloured", black and white experimental subjects of both sexes and language groups possible. This would amount to 32 different norm tables.

The research on the Kodus (Meyer, 1980) revealed that the norm differences between

language groups as well as the norm differences between standard groups are small and insignificant, while the norm differences between the sexes is significant. But for one exception, the same results were found with the MB-l0 when the norm tables of the different groups were statistically analysed. Additionally, in the case of the MB-l0, the norm tables of the different race groups were compared to one another. The only significant difference (on the 5% level) was found between grade 9 and grade 11 white boys with regard to the *Gr*-field. However, if the combined group's norm scores in this field are taken, the separate groups do not differ significantly from it. Thus, the aforementioned difference does not influence the accuracy of the counselling. In fact, the results show that "coloured", black and white English- and Afrikaans-speaking grade 9 and grade 11 boys on the one hand, and "coloured", black and white English- and Afrikaans-speaking grade 9 and grade 11 girls on the other hand, actually have the same broad interest patterns.

Against the above-mentioned background it is scientifically sufficient to provide only the following four norm tables for the MB-10:

High school boys
High school girls
First year male students
First year female students

These norm tables are provided on toward the end of the manual. In comparison with the total of 52 norm tables that could be used for the Kodus, the MB-10 is much simpler and more economical regarding both test administration and interpretation.

4.4   General findings

The following general findings in connection with interest were evident in the standardisation of the MB-10 for grade 9 and grade 11 learners and first-year university students:

-   The female groups generally obtained low scores on figures and especially on practical work with machines. It would appear that the identification with the sex role has a pronounced effect on interest. It seems to be a tradition in South Africa that the female sex is not associated with figure work and especially machine work. Meyer (1980) made similar findings in the standardisation study of the Kodus.

-   The male groups generally obtained low scores on the linguistic and artistic fields. It also seems that sex identification has an effect on the interest of males in these fie1ds.

-   Both sexes generally obtained low scores on plants. Possible explanations are that work with plants is associated with a compulsory domestic chore, namely to work in the garden, or that the participants have the perception that there are very limited career possibilities in this field.

-   The interest differences between sexes are somewhat greater (often significantly so) than those between age, race or language groups which are small and, with one exception, insignificant. It would appear, therefore, that gender differences play a large role in interest, as opposed to the other biographical variables.

- It was generally evident that the students answered the questionnaire more reliably than the learners. This can be inferred from the observation that the reliability coefficients for the students were consistently higher than those of the learners (Table 2). From this it may be deduced that greater reliability accompanies an increase in age and especially in educational level.

- When comparing the results of the black learners, who answered the questionnaire in their second language, with those of the other groups, a definite trend of lower reliability coefficients amongst this group, in comparison to the white and "coloured" learners, is noticed. It would therefore appear as if command of language plays a major role in reliability.

4.5 Reliability

Reliability is the degree of accuracy and consistency of a test. The reliability of the MB-10 has been determined by two different methods: internal consistency and item analysis.

4.5.1 Internal consistency

The internal consistency of the questionnaire was determined by means of the split-half method, using even and uneven numbers in its implementation. The internal reliability indices of three main groups - students, "coloured" and black grade 9 and grade 11 learners, as well as white grade 9 and grade 11 learners, are reported in Table 1.

Table 1: Internal consistency of the MB-10 for First-year University students and Grade 9 and Grade 11 learners

Fields	First-year students (n = 1913)	"Coloured" and Black Grade 9 and Grade 11-learners (n = 556)	White Grade 9 and Grade 11-learners (n = 766)
In	.91	.81	.91
Gr	.91	.73	.88
B	.95	.91	.93
Nu	.95	.88	.93
L	.89	.80	.84
A	.88	.67	.86
Pr	.90	.80	.90
Sc	.93	.86	.93
Z	.90	.91	.90
P	.91	.87	.90

4.5.2 Item analysis and reliability coefficients

By means of item analysis, reliability indices (Kuder-Richardson 14 and 20) were obtained for all the items of a specific field collectively. This data is detailed in Table 2.

No investigation was done regarding the test-retest reliability of the MB-10. It is worth noting, however, that the MB-10 is based upon the Kodus and that Meyer (1980) found that at least one of the top three rank orders on the Kodus was again amongst the top three after a period of four years with 91% of the subjects.

Table 2: Reliability coefficients obtained in each MB-10 field for each of the different Subgroups

	Subgroups		In	Gr	B	Nu	L	A	Pr	Sc	Z	P
							Fields					
Students	Afr	Male	.88	.90	.93	.93	.87	.88	.92	.93	.92	.89
Students	Afr	Female	.88	.91	.94	.94	.88	.91	.80	.93	.92	.85
Students	Eng	Male	.90	.89	.95	.92	.87	.89	.93	.92	.86	.90
Students	Eng	Female	.88	.90	.92	.94	.87	.92	.77	.89	.88	.88
Boys	Afr	"Coloured"	.75	.75	.91	.90	.68	.83	.82	.84	.92	.85
Girls	Afr	"Coloured"	.78	.71	.89	.86	.75	.75	.75	.87	.86	.83
Boys	Eng	Black	.60	.77	.85	.87	.80	.54	.69	.81	.81	.85
Girls	Eng	Black	.69	.65	.82	.89	.67	.43	.64	.74	.72	.88
Boys	Afr	White	.80	.85	.92	.93	.79	.89	.92	.92	.94	.89
Girls	Afr	White	.87	.87	.90	.90	.78	.89	.82	.90	.92	.80
Boys	Eng	White	.82	.87	.91	.91	.82	.84	.91	.88	.92	.89
Girls	Eng	White	.79	.88	.89	.89	.82	.91	.75	.83	.90	.86

4.6 Validity

The validity of the MB-10 was investigated in two different ways. Firstly, the simultaneous validity of the MB-10 scores and the choice of degree courses was investigated amongst first-year students at the University of Stellenbosch. A random sample of students was drawn for each of the main directions. The courses with the top three rank orders are reported in Table 3.

Table 3: Top three MB-10 rank orders of the various University course groups

Course	Rankorder		
	1	2	3
MBChB	Z	Sc	In
BSc.Agric.	P	Z	Sc
BSc.	Sc	Nu	Pr
BIng.	Pr	Sc	Nu
BA. with Psychology	In	Gr	L
BA. with Languages	L	Gr	A
BA. with Law	Gr	L	B
BComm.	B	Nu	L
BRek.	Nu	B	L

In an analysis of the actual MB-10 scores it was revealed that typical profiles for these courses could be clearly distinguished from one another. It was found that the highest rank orders of the MB-10 fields corresponded throughout with the typical content of each of the various courses and with the occupations to which these lead.

Secondly, the simultaneous validity of the MB-10 scores and the preference for school subjects was investigated amongst a sample of 446 learners. The gender, language and race groups were more or less evenly represented in this group. Table 4 indicates which subject preference group obtained the highest average score in each interest field.

Table 4: School Subject Preference Group that obtained the Highest Average Score in each of the MB-10 Fields

MB-10-FIELDS		Subject preference with the highest score
People as individuals	(In)	Languages
People in groupw	(Gr)	History
Business activities	(B)	Economics
Figures	(Nu)	Mathematics/Accountancy
Linguistic	(L)	English/German
Artistic	(A)	Art
Practical	(Pr)	Woodwork
Physical science	(Sc)	Physical science
Animals, Biological science	(Z)	Biology
Plants	(P)	Biology

When the validity studies with the students and the learners are viewed collectively, it seems that the content of the MB-10 fields has been described correctly and that the questionnaire indeed measures interest within these ten fields.

5. STANDARDISATION OF THE MB-10 FOR GRADE 7 LEARNERS (Wium, 2001)

5.1 Sample and Application

The sample consisted of 1923 grade 7 learners. In order to make the investigation as representative as possible, the widest possible distribution of learners was obtained by sampling learners from both various urban schools in the Cape Peninsula and from country schools in the Worcester region. The ratio of learners drawn from urban/country schools was approximately 70/30. The ratio of boys to girls was approximately 50/50 and the ratio of Afrikaans-/English-speaking learners was approximately 40/60. Nearly 70% of the learners came from "coloured" and black schools while the rest of the learners came from white schools.

The Afrikaans version of the MB-10 used by Meyer (1993) was elaborated via the inclusion of an Afrikaans glossary of terms that was compiled and handed out together with the questionnaire.

The questionnaire was applied to the above-mentioned samples during the second school-term (July) of 2000.

5.2 Reliability coefficients and item-analysis

As mentioned earlier, reliability coefficients of $r \geq 0,65$ for the various fields are usually regarded as acceptable for this type of questionnaire. In this standardisation investigation, an initial value of $r \geq 0,60$ was set as the accepted minimum level of reliability.

The acceptable value of $r \geq 0,65$ was obtained for all ten fields amongst the white boys and white girls subgroups and, with single exceptions, also with the "coloured" boys and "coloured" girls subgroups. The only fields that did not achieve the set minimum level of reliability amongst the latter subgroups were the *In*-, *Gr*- and *L*-fields amongst

the "coloured" boys subgroup (where r < 0,60) and the *L*-field amongst the "coloured" girls subgroup (although the reliability coefficient was above the accepted minimum level of r ≥ 0,60).

Both the black boys and black girls subgroups only achieved a reliability coefficient greater than 0,65 for three of the ten fields. The three fields for the black girls subgroup were the *Sc*-, *Z*- and *P*-fields, and for the black boys subgroup the three fields were *Nu*-, *Z*- and *P*-fields (although r > 0,60 for the *Sc*-field). The reliability coefficients for the remaining seven fields were well below the accepted minimum reliability coefficient of r ≥ 0,60 for the latter two above-mentioned subgroups.

Due to the extremely low reliability coefficients, especially amongst the black subgroups, and the suppressing effect that it has on the item-total correlations (which in turn lowers the reliability of the measuring instrument as a whole), the accepted minimum level of reliability for the black and "coloured" subgroups were adapted to r ≥ 0,50. This resulted in the "coloured" boys subgroup now only achieving reliability coefficients below the accepted minimum level in the *In*- and *Gr*-fields, while only the *In*-, *Gr*- and *Pr*-fields (amongst the black boys) and the *Gr*- and *A*-fields (black girls) now had reliability coeffients below the accepted minimum level for these two subgroups.

An item-analysis of the results of the six groups (three main groups each subdivided into two subgroups) with regards to all ten fields of the questionnaire, was conducted (Table 6). These results are reported in detail in this manual.

An analysis of the reliability coefficients (Table 6) for the "coloured" and black groups indicates that these coefficients are low in mainly five fields, namely Individuals *(In)*, Groups *(Gr)*, Artistic *(A)*, Linguistic *(L)* and Practical *(Pr)*. In addition to the possible deficiencies in language comprehension and/or exposure amongst the "coloured" and black groups, the low reliability coefficients may be attributable to other factors:

- Previous research demonstrated that young learners are socially uncomfortable due to their developmental phase and therefore take greater interest in animals than in people (Meyer, 1980). In addition limited access to career development may result in black and "coloured" learners being less aware than whites of occupations in these fields. It may also be that the item content failed to take cognizance of the socio-economic and socio-cultural realities of diverse groups. According to Taylor and Boeyens (1991) customs and traditions, cultural beliefs and disparities in socio-economic status can affect item relevance.

- *In*-field: Gender-role indentification amongst black and "coloured" boys, where boys in these cultures may perceive humanistic involvement with people as a female area, could have contributed to the low reliability coefficients amongst these subgroups.

- *Gr*-field: Together with the first above-mentioned point it may be that black boys especially (and to a lesser extent "coloured" boys) are unable to imagine themselves in the type of items that occur in this field due to the oppressive apartheid legacy during which very few public role models were visible. They may therefore judge activities such as public performance, delivering speeches and leadership to be invalid.

- **A**-field: A lack of comprehension, or a lack of (or no) exposure to art activities and artists may be the reasons why black learners do not view these items to be valid. It may be that their entire world of living is so tuned into just surviving that they regard art activities as non-functional and a luxury.

- **L**-field: It is possible that black and "coloured" learners do not really have access to books and do not spend much time with books, and therefore regard these items as invalid. It should be noted that the language used in many of the items in this field was difficult for the learners to understand, and that this may also have contributed to the low reliability coefficients for this field that occurred amongst these subgroups.

- **Pr**-field: The possible resistance to practical work, whether it is associated with a previous political regime (in terms of the fact that black learners were then mostly restricted to hand- and machine-work) or wheher it is associated with low socio-economic circumstances (circumstances that the learners would like to escape from), could have contributed to the low reliability coefficients in this field. The possible association with practical work during the apartheid era has in all likelihood been learnt by the learners from their parents, via their parents socialising them to aspire towards more theoretical white collar occupations.

When a specific item-analysis is conducted on the individual problem items for "coloured" and black subgroups, it appears as if the majority of these items were problem items due to the fact that they either, fell outside of the experience-worlds of the learners, or were unknown (alien) within their community context. Language comprehension, may be the most important factor that resulted in the low reliability coefficients. Even though the simplification of the language of the items of the questionnaire should lead to an increase in the reliability coefficients, it is clear from the above that culture-specific factors may also play a role.

5.3 Norms

The above results were used for the calculation of norms for the "coloured", black and white samples of both sexes. This resulted in six different norm tables. Chi-square tests were used to test for any significant differences between the norms of the various subgroups.

There was no significant difference between white, "coloured" and black learners in any of the fields. The results indicate that grade 7 "coloured", black and white boys, and grade 7 "coloured", black and white girls, respectively, have essentially the same broad interest patterns. Therefore, only the following two norm tables need to be made available for grade 7 learners:

Combined norms for white, "coloured" and black grade 7 boys
Combined norms for white, "coloured" and black grade 7 girls

These results are in agreement with that of previous research that has found that the norm differences between language groups and standard groups (Meyer, 1980), as well as the norm differences between races (Meyer, 1993), are small and insignificant, while the norm differences between gender are significant (Botha, 1996; Meyer, 1980, 1993; Owen & Taljaard, 1988; and Stead, 1988).

Furthermore, since only two norm tables are needed for grade 7 learners, the

characteristics of the original MB-10, in terms of economical test administration and interpretation, are retained. The combined norms for white, "coloured" and black grade 7 boys, and those of white, "coloured" and black grade 7 girls, are reported further on in the manual.

5.4 General findings

The following general findings with regards to interest came to the fore during the standardisation of the MB-10 for grade 7 learners:

- An analysis of the fields and items indicates that there are amongst the "coloured", and especially the black, subgroups 14 items in four fields of which the reliability coefficients are unacceptably low – an inspection of the content indicated that this could be ascribed to lack of vocabulary and comprehension, lack of exposure to and unfamiliarity with the activities.

- No significant difference exists amongst the ten interest fields between the races, in terms of their interest, although differences between the genders are present.

- The investigation into the validity of the MB-10 confirmed that the MB-10 does indeed measure interest.

5.5 Reliability

The reliability of the MB-10 for grade 7 learners was determined in two different ways, namely by means of internal consistency and item-analysis.

5.5.1 Internal consistency

The internal consistency was calculated via the split-half method, using even and uneven numbers in its implementation. The internal consistency indexes for the three race groups, namely white, "coloured" and black, amongst the grade 7 learners, are detailed in Table 5.

Table 5: Internal Consistency of the MB-10 for White, "coloured" and Black Grade 7 learners (N = 1923)

Fields	White Grade 7-learners (n = 608)	"Coloured" Grade 7 learners (n = 851)	Black Grade 7 learners (n = 464)
In	.85	.72	.52
Gr	.85	.60	.34
B	.82	.69	.46
Nu	.90	.76	.65
L	.80	.57	.45
A	.88	.65	.43
Pr	.90	.72	.44
Sc	.90	.77	.65
Z	.92	.83	.66
P	.88	.77	.62

5.5.2 Item-analysis and Reliability coefficients

A reliability coefficient (Kuder-Richardson 14 and 20) was obtained for each of the 36 items via item-analysis. This data is reported in Table 6.

Table 6: Reliability Coefficients for each MB-10 field obtained for each of the different Subgroups

Subgroups		Fields									
		In	Gr	B	Nu	L	A	Pr	Sc	Z	P
White Girls	(n = 319)	.82	.85	.84	.88	.80	.86	.73	.91	.93	.90
White Boys	(n = 289)	.67	.81	.86	.90	.72	.84	.88	.89	.94	.91
"Coloured" Girls	(n = 421)	.66	.65	.78	.82	.63	.73	.67	.79	.87	.83
"Coloured" Boys	(n = 430)	.48	.48	.73	.75	.56	.66	.67	.77	.84	.79
Black Girls	(n = 253)	.56	.37	.55	.75	.54	.48	.47	.61	.71	.70
Black Boys	(n = 211)	.41	.28	56	.55	.54	.48	.34	.70	.72	.70
Total Group	(N = 1923)	.76	.72	.78	.83	.75	.76	.81	.84	.91	.83

5.6 Validity

The validity of the MB-10 was determined by investigating the simultaneous validity of the learners' (N = 1923) MB-10 scores and their school subject preferences. The subject preference group that obtained the highest average score in each interest field is reported in Table 7.

Table 7: School Subject Preference Groups that obtained the Highest Average Score in each of the Interest Fields

MB-10-FIELDS		Subject preference with the highest score
People as individuals	(In)	Languages
People in groups	(Gr)	Languages
Business activities	(B)	Mathematics
Figures	(Nu)	Mathematics
Linguistic	(L)	English
Artistic	(A)	No clear subject preference
Practical	(Pr)	Mathematics
Physical science	(Sc)	Maths/Science
Animals, Biological science	(Z)	Maths/Science
Plants	(P)	Mathematics

The learners' subject preference and the corresponding highest interest field is given in Table 8.

Table 8: Subject Preferences and Corresponding Highest Interest Field for Grade 7 learners

Subject preference	Highest interest field	
Afrikaans	People as individuals	(*In*-field)
English	People as individuals	(*In*-field)
Xhosa	Linguistic preference	(*L*-field)
Mathematics	Figures	(*Nu*-field)
Science	Physical sciences	(*Sc*-field)
Geography	Animals, zoology and related biological work	(*Z*-field)
History	People as individuals	(*In*-field)
Practical	Practical work	(*Pr*-field)

From the above it would appear that the MB-10 questionnaire does indeed measure interest in these ten fields amongst grade 7 learners.

6. APPLICATION

6.1 General instructions

6.1.1 Test administration

A psychological test is classified as such if it, amongst others, measures interest, and the MB-10 can therefore be classified as such. For this reason, the application of the MB-10 should be carried out by a Psychologist, or be supervised by a Psychologist. In the event that a Psychometrist applies the MB-10, it should only transpire under the supervision of a Psychologist.

6.1.2 Test participants

6.1.2.1 Cultural considerations

Due to the fact that the MB-10 is only available in Afrikaans or in English, it goes without saying that those test participants that have English or Afrikaans as a first language would have less trouble with language comprehension. The MB-10 is therefore technically better suited for those participants who are able to complete the questionnaire in their first language, irrespective of race. Various problematic items were found in the standardisation study, especially for the black subgroups, in terms of language comprehension or that the items were possibly too sophisticated or fell beyond the realms of experience of the learners. As mentioned earlier, it does not help to change individual items within a test that is reliable as a whole; while it may increase the reliability coefficients of the individual items, it undermines the reliability of the test as a whole. Until such time as the MB-10 is translated into an African language, the glossaries that appear at the

back of both the Afrikaans and the English version will have to suffice. Therefore, the MB-10 can be considered reliable for white, "coloured" and black learners.

6.1.2.2 General considerations

The MB-10 can be applied individually or in groups. The tester should try to obtain the wholehearted cooperation of all the testees. He/she must acquaint him/herself thorougly with the test procedure and instructions before administering the questionnaire.

6.1.3 Test venue

Testees must preferably complete the questionnaire in a room where they can work comfortably under controlled circumstances without being disturbed.

6.1.4 Test material

Each testee is provided with a test booklet (he/she can choose between an Afrikaans or an English questionnaire), an answer sheet, a pencil and an eraser. The manual is used by the tester only.

6.1.5 Test time

No time limit is set, but testees must be encouraged to give their first impulse reaction - in other words to answer the questionnaire as quickly as they can read. Learners should be able to complete the questionnaire in approximately 35 minutes, while it should take students approximately 25 minutes.

6.2 Test instructions

6.2.1 Testees must be asked to handle the test booklet with care so that it can be used again in the future. No part of it may be folded and no marks should be made in it. The answer sheet must only be marked or completed in the appropriate spaces. Only a pencil must be used to mark the answer sheet.

6.2.2 Hand out the test material. The testees must fill in the necessary details on the answer sheet. Then the tester carefully reads out the instructions in the test booklet. These instructions are valid for both the hand answer sheet and the computer answer sheet.

6.2.3 Let the testees now turn the page and start answering the questionnaire. Go round the testing room and see to it that every testee has started in the right place and that he/she is answering the questions in the correct way.

6.2.4 Testees may ask questions about any aspect of the questionnaire which is not clear to them. In the event that testees struggle with the comprehension of particular words in the questionnaire, they may refer to the glossary that is found on the last page of the questionnaire. This is especially applicable to the younger testees (grade 7 learners) and those testees for whom the questionnaire is not set out in their mother-tongue (e.g. first language African-language speakers).

6.2.5 It should be noted that the above mentioned test guidelines should be very carefully explained to especially the younger testees (grade 7 learners) to ensure that they understand what is expected of them.

7. SCORING OF THE MB-10

7.1 It is essential that a standardised test should be scored with the greatest accuracy.

7.2 Before scoring, the answer sheets should be checked for items where more than one answer space, or no answer space has been marked. If possible, the testee should be questioned about it. If this is not possible, these items should not be taken into account. If, however, more than six such cases occur on any one answer sheet, the completion of the questionnaire should be considered unreliable.

7.3 In cases where testees have followed a fixed pattern in answering the questions, the seriousness and understanding with which the answer sheet was completed should be ascertained. If this is not possible, the completion of the questionnaire should be considered unreliable.

7.4 An easy score-controlling procedure is to add up the raw score totals of the different fields. If the sum total is not 120, then something is wrong. With due allowance for points **7.1**, **7.2** and **7.3** it is permissible for testees to count their own field scores under certain circumstances such as a shortage of test scorers. Scoring errors can be greatly eliminated by using a ruler to guide the eyes at each column.

7.5 Whether the answer sheet is scored by hand or machine, the following points are important:

- Each of the ten fields is scored separately.
- Each marked item counts one (1) mark.

7.6 When the computer answer sheet is scored with an optic reader, a scoring stencil and test model are required. The test model is provided at the end of this manual. The model is compiled in such a way that the different fields are distributed proportionally in the different answering positions a, b, and c. Furthermore, the questions are distributed so that there are no set pattern of successive fields and that any given field is distributed over the entire questionnaire.

7.7 In the case of the answer sheet which is scored by hand without a stencil, it should be noted that the different columns on the answer sheet represent the following fields:

1	=	In	6	=	A
2	=	Gr	7	=	Pr
3	=	B	8	=	Sc
4	=	Nu	9	=	Z
5	=	L	10	=	P

7.8 After counting the raw score of the testee in each field, the norm percentiles of the testee can be ascertained and his interest profile can be drawn. Additionally, it is possible to use only the raw scores in order to obtain a field rank order, but this does not allow the drawing of a profile.

8. USE OF THE NORMS

8.1 When the norms are being used, it should be borne in mind that the two standardisation studies were only conducted upon grade 7, 9 and 11 learners in the Western Cape Province and students at one University. The generalisation of the results to any other group that falls outside of this population, should therefore be done with caution.

8.2 With the possible exception of grade 8, the norms for grade 9 and grade 11 learners can be used for all highschool learners, and those of first year students for all university students.

8.3 The raw scores can be used in some cases where persons are not accommodated by the existing norms, for example technikon students, however it may be quite useful to consult the norm table of the closest corresponding, or bordering, group (for instance university students). In the case of grade 8 learners, either the grade 7 or the grade 9 norm tables can be used, depending on whether the test is completed during the first (first two terms) or second (last two terms) semester of the year.

8.4 The raw score obtained is first located in the column underneath "X" in the norm table, whereafter the corresponding percentile score is read in the column of the field concerned.

9. INTERPRETATION OF TEST RESULTS

9.1 It is of the utmost importance when interpreting the MB-10 to realize that both raw scores and norm scores should be taken into account. The raw scores provide a rank order of fields for each individual. The norm scores (in this instance percentiles) provide a comparison of the person's interests with those of other persons of the same sex and educational level.

In balanced counselling both sets of data should be taken into account otherwise a distorted conclusion about the person's interests may result. It is, for example possible that a girl may obtain her highest raw score (19) in the *In*-field but not reach the 40th percentile, whereas her lowest raw score (8) in the *Pr*-field would give her a percentile score of 71.

By only considering the percentile scores, the deduction could easily and wrongly be made that she has a very low interest in work with people and a very high interest in practical work. On the other hand by only focusing on the raw scores it would not be realised that she surpasses only 37% of her peer sex group with regard to the *In*-field.

9.2 Since there is usually competition with other candidates for an occupational position, and following appointment, working together with other persons in the same occupational group is required, it is valuable for persons who have to make career choices to compare themselves with their norm group. Norms make such comparisons scientifically possible - as a matter of fact it is one of the results of the standardisation of a test or a questionnaire.

9.3 The norms have been converted to a percentile scale. When interpreting the percentiles of an individual, it should be kept in mind that the questionnaire is not a final and precise means of measurement. The following broad guideline for the interpretation of the profile is suggested:

70%	-	100%	definite preference
40%	-	69%	neutral - however, could contribute to preference or dislike
0%	-	39%	definite dislike

9.4 Both high ($\geq$ 70) and low ($\leq$ 40) percentiles should be used as guidelines when identifying vocational directions which could be considered by the individual as likely careers. Provided that this is confirmed in the course of the interview, low percentiles, being an indication of a lack of interest or dislike, could be an indication of careers that should rather be avoided.

9.5 Although high percentiles (70+) could individually be regarded as an indication when choosing a career, it is desirable that career possiblities should rather be considered in the light of combinations of those fields in which a definite preference is shown. There are few careers which are restricted to a strong interest in only one of the MB-10 fields. When only one high percentile is considered, it is possible that a person may choose a career which will not provide the necessary job satisfaction.

9.6 When the MB-l0 results are interpreted in the course of the counselling process, the scores should not be regarded as the final ruling in respect of the interests of the individual. They should rather be regarded as an indication of interests which should be verified, where possible, by other pointers such as hobbies and subject preference. The interest profile should be considered furthermore in relation to the individual's personality, aptitude, ability and scholastic performance, as well as the career possiblities determined by his/her school subjects.

9.7 Knowledge of a specific occupation, e.g. that of the father, does not necessarily promote an interest in it. Sound vocational knowledge usually results in a sound judgement.

9.8 The interest of a person is relatively constant over a short period although temporary fluctuations may occur. Over a longer period the following three factors should be taken into account:

- Development: The personality development of an individual will influence his interests.

- Age: The interest patterns of older children (grade 12) are often more differentiated than those of younger children (grade 7 or 8).

- Environment: It is quite possible that new environmental stimuli could influence an individual's interest.

9.9 When using the MB-10 to determine subject choice, the following guidelines should be kept in mind:

- Cognisance should be taken of the learner's scholastic performance in all subjects.

- Matriculation exemption requirements and/or subject combinations that are required

for specific occupations, sometimes restrict the learners' range of choice.

- As the interests of younger learners are often not clearly differentiated, it is of the utmost importance that the results of the questionnaire be interpreted with greater circumspection in their case.

10. STRUCTURED VOCATIONAL GUIDANCE WITH THE MB-10

10.1 Elucidation

Structured vocational guidance is a mode to lead a person through the maze and multitude of occupational fields to a manageable number of careers from which a choice can be made. It is especially valuable for the less experienced and less knowledgeable career counsellor. It may be useful even for the professionals as they would be able to check whether important career possibilities have not been overlooked during the vocational guidance.

If individuals have no vocational guidance assistance whatsoever at their disposal they could, as a last resort, explore career fields on their own and find vocational direction by using the structured method themselves.

This structured method is not a simplistic, exact recipe according to which vocational guidance should be done. Rather it is an endeavour in which people are channeled in an orderly manner towards suitable basic directions without the guidance being paralysed by all the complexities normally attached to it.

It is clearly realised that vocational choice does not merely depend upon interest - many other factors such as aptitude, availability of funds for training and availability of work often play a decisive role with regard to the career direction and position in which people ultimately find themselves. However, by searching for directions which correspond with their interests, individuals enhance the prospect of attaining job satisfaction and probably a more productive life. In order to make a realistic choice it is important to consider both the direction and the level of the occupation. With this method all levels of occupations can be entertained. If necessary, publications such as "My Career" and others could be consulted to ascertain the different qualification levels for a given direction.

10.2 Rationale

The rationale is that a list of occupations and their required or desired MB-10 symbols are supplied to provide clients with vocational guidance with regard to the interpretation of their questionnaire results.

No claim to an exhaustive list of all possible careers or occupations is made - the emphasis has rather been on the major and general directions which are to be found in South Africa.

10.3 Method

After the MB-10 has been answered, the scores in each of the fields are obtained by

counting the number of marked responses in each field. These raw score totals in each field can now be compared to determine the person's rank order of fields. However, if at all possible, it is preferable to consult the norm tables and to convert the raw scores to percentiles and then see in which fields interest is the highest.

The field names are indicated by symbols. The sequence in which these symbols appear on the list is of importance. The first or the first two capital letter symbols is usually the primary interest component for the occupation, whereas further symbols mostly refer to secondary aspects of the occupation and are indicated in small letters.

Persons now search for those occupations which they should consider in the light of their interests by beginning with the highest symbol and thereafter trying to find those occupations which would also include their combinations of supplementary symbols.

10.4 Take note:

The same occupation may occur in more than one MB-10 field on the list. The reason for this is that individuals differ as to where they place the emphasis in a specific occupation. So, for instance, one person may choose engineering because it is seen as a practical scientific occupation, whereas another person is attracted to it because of its mathematical or design aspect.

The symbols should not always be viewed as absolute requirements for specific occupations - it is more a case of occupations which are usually associated with high scores in certain MB-l0 fields.

The connection of some MB-l0 symbols with certain occupations may at first glance seem questionable. This is because the symbol names are sometimes misleading. It should for example be remembered that Animals *(Z)* also refers to physiology and anatomy and that Linguistic *(L)* also includes written clerical work.

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12. MB-10 LIST OF OCCUPATIONS

In = PREFERENCE FOR WORKING WITH PEOPLE AS INDIVIDUALS OR WITH SMALL GROUPS OF PEOPLE

In-pr	Cabin attendant
In-l-gr	Career counsellor
In-l-gr	Child welfare-officer
In-pr-l-a	Children's nurse
In-gr-z	Coach (sport)
In-pr-l	Conductor
In-pr	Conductor (train)
In-l-gr	Counselling psychologist
In-gr-l	Counsel1ing teacher
In-gr-l-z	Counsellor: Family planning
In-l-gr	Criminologist
In-sc-l	Detective
In-1-gr	Ground hostess
In	Hospital porter
In-l-gr-b	Hotel reception officer
In-pr-b	Housing officer
In-a-pr-gr-l	Kindergarten teacher
In-l-gr	Marriage counsellor
In-l-nu	Medical receptionist
In-pr-z	Midwife
In-z-pr	Nurse
In-a-pr-gr- 1	Nursery school teacher
In-gr-1	Police officer
In-gr-1	Primary School teacher
In-l-b-pr	Private secretary
In-l-z	Psychologist (clinical)
In-b-l	Recruiting officer
In-1/nu	Remedial teacher
In-nu-l-sc-z	Research psychologist
In-l-gr	Social welfare officer
In-pr-l-nu	Telephonist
In-pr	Ticket examiner
In-l	Usher
In-pr-gr	Waiter
In-Gr-l-a-pr	Air hostess
In-Gr-pr-nu-b	Barman
In-Gr-L	Clergyman
In-Gr-l-b	Foreign Service officer
In-Gr-l	Warden (prison)
In-B-l-gr	Industrial Psychologist
In-B-l-nu	Personnel officer
In-B-nu	Shop assistant
In-L-B-gr	Attorney
In-L	Immigration officer

In-L-gr	Magistrate
In-L-pr	Messenger
In-L-gr	Missionary
In-L	Probation officer
In-L-z	Speech therapist
In-Pr-z	Dental\Oral hygienist
In-Pr-sc-z	Dentist
In-Pr-z	Masseur
In-Pr-a-z	Occupational therapist
In-Pr-Sc-z	Physiotherapist
In-Sc-z	Family doctor
In-Sc-z	Psychiatrist
In-Z-pr-sc	Optician

Gr = PREFERENCE FOR PUBLIC APPEARANCE AND WORKING WITH GROUPS OF PEOPLE

Gr-b-pr-in	Factory manager
Gr-l-in	Foreign service officer
Gr-in-pr	Foreman
Gr-a	Mannequin
Gr-in-z-sc	Matron (hospital)
Gr-sc-nu-pr-in	Merchant marine officer
Gr-sc-pr-in	Naval officer
Gr-l-gr	Political organiser
Gr-l-In	Politician
Gr-b-nu	Production manager
Gr-in-b-1	Recruitment officer
Gr-nu-sc-in	Ship's captain
Gr-in-1	Sociologist
Gr-in-1	Sport organizer
Gr-in-pr-nu	Station master
Gr-in-pr-l	Traffic cop
Gr-in-l	Training officer
Gr-In-L	Anthropologist
Gr-In-pr-sc	Army officer
Gr-In-L-b	Attorney
Gr-In-l-b	Diplomat
Gr-In-L-a	Drama teacher
Gr-In-l	Instructor
Gr-In-L	Lecturer
Gr-In-b	Manager
Gr-In-z-pr	Matron (hospital)
Gr-In-L	Minister (religion)
Gr-In	Teacher (General)
Gr-In-1	Tour guide

Gr-B-nu	Auctioner
Gr-B-In-nu	Hotel manager
Gr-L-a	Actor
Gr-L-in	Advocate
Gr-L-in	Broadcaster
Gr-L-in	Information officer
Gr-L-in-b	Lawyer
Gr-L-in-b	Prosecutor
Gr-L-in	Public prosecutor
Gr-L-in-b	Public relations officer
Gr-L-in-b	Publicity officer
Gr-L-in	Radio broadcaster
Gr-L-in	Tour guide
Gr-L-in	TV-presenter
Gr-A-l-in	Ballet dancer

B = PREFERENCE FOR BUSINESS ACTIVITIES

B-nu-a-l	Advertising agent
B-z-p-nu	Agricultural economist
B-in-pr	Automotive salesman
B-nu	Business economist
B-in-nu	Café-owner
B-nu-pr-in	Car dealer
B-in-nu	Commercial traveller
B-nu-in	Credit manager
B	Entrepreneur: Small business
B-in-nu	Estate agent
B-nu	Importer
B-nu-gr-pr-in	Industrial consultant
B-	Informal (home) business person
B-pr	Manufacturer
B-in-nu-l	Market agent
B-z-sc-nu	Medical representative
B-pr-nu	Motor spares dealer
B-in-nu	Retailer
B-gr-nu-in	Sales manager
B-in-nu	Sales person
B-nu-in	Shopkeeper
B-nu	Speculator
B-l-gr	Sports administrator
B-l-gr	Sports manager
B-in-nu-l	Travel agent
B-nu	Wholesaler
B-In-nu-gr-a	Hotel manager
B-In-nu	Insurance agent
B-In-nu	Insurance broker
B-In-nu-gr	Personnel consultant

B-In-l-gr	Personnel manager
B-in-nu	Sales representative
B-In-gr-a	Undertaker
B-Gr-nu-in	Business executive
B-Nu-l-in	Business economist
B-Nu	Economist
B-Nu-in	Financial director
B-Nu-in-gr	Financial manager
B-Nu-l-in	Industrial economist
B-Nu	Insurance assessor
B-Nu-in	Investment advisor
B-Nu-in	Purchasing manager
B-Nu-in	Stockbroker
B-Nu-l	Transport economist
B-A-pr	Shop decorator
B-Pr-nu	Building contractor
B-P-in	Fruit vendor
B-P-in	Vegetable vendor

Nu = PREFERENCE FOR WORKING WITH FIGURES

Nu-b	Accountant
Nu-b-1	Actuary
Nu-b	Auditor
Nu-in-b-l	Bankc1erk
Nu-z-p-sc	Biometrist
Nu-b-l	Bookkeeper
Nu-pr	Building surveyor
Nu-in-b	Cashier
Nu-b	Chartered accountant
Nu-b	City/Town treasurer
Nu-l-sc/b	Computer programmer
Nu-b/sc-l	Computer scientist
Nu-b/sc-l-	Computer systems analyst
Nu-b	Cost accountant
Nu	Data processor
Nu-b	Estate valuer
Nu-l-b	Income tax officer
Nu-1	Insurance statician
Nu-sc	Land surveyor
Nu-b	Market researcher
Nu-sc	Mathematician
Nu	Meter-reader
Nu-sc	Mine surveyor
Nu-sc-in-gr	Navigation officer
Nu-sc-pr	Navigator

Nu-l-b	Payclerk
Nu-sc/b-1	Programmer
Nu-b-sc	Quantity surveyor
Nu	Statistician
Nu-b-1	Stock controller
Nu-sc-l	Systems analysist
Nu-l-b	Tax officer
Nu-b-in	Teller
Nu-sc-1	Topographic surveyor
Nu-1-b	Treasurer (general)
Nu-l-b	Wage clerk
Nu-In-Gr-b	Accountancy teacher
Nu-In-Gr-sc	Mathematics teacher
Nu-B-Gr-in	Bank manager
Nu-B-in-l	Bank officer
Nu-B-l-in	Building Society officer
Nu-B-gr	Circulation manager
Nu-B-gr-in	Credit manager
Nu-B-1	Credit supervisor
Nu-B	Financial controller
Nu-B	Management accountant
Nu-B	Tax expert
Nu-Pr-a-sc	Surveyor
Nu-Sc-pr-a	Civil engineer

L = LINGUISTIC PREFERENCE. PREFERENCE FOR READING AND WRITING

L-b/nu	Administrative officer
L-sc-pr-a	Archaeologist
L-a	Archivist
L-nu-pr-b	Building clerk
L-b-nu	Chartered secretary
L-nu	Clerk
L-b-nu	Company secretary
L-a-b	Copywriter
L	Correspondence clerk
L-a/z/p/sc	Curator
L-b-nu	Customs and Excise officer
L-gr-in	Editor
L-in	Foreign correspondent
L-gr	Historian
L-b-in-gr	Hospital administrator
L-in	Hotel clerk
L-in-gr	Interpreter
L-b-nu	Invoice clerk
L-in-gr	Journalist
L-gr-in	Judge

L-gr-in	Jurist
L	Language officer
L-Gr-In	Lawyer
L-in	Librarian
L-a-in	Magazine journalist
L-in-gr	News commentator
L-in-gr	News journalist
L-b-nu	Notary
L-a-in-gr	Playwright
L-a-in	Poet
L-in-b-nu	Post Office clerk
L-pr	Post sorter
L-pr	Postman
L-nu-gr-in-b	Postmaster
L-a-gr-in	Producer
L-in-b-a	Production secretary
L	Proof-reader
L-gr-a	Radio programme director
L-gr-in	Radio journalist
L-pr-b	Secretary
L	Shorthand-writer
L-in-gr	Sports writer
L-pr	Telegraphist
L-gr-in	Television broadcaster
L-in-gr	Theologian
L-in-gr-a/pr/sc	Town and Regional Planner
L-in-gr	Town clerk
L	Translator
L	Writer
L-In	Interpreter
L-In-Gr	Language teacher
L-In-a	Library assistant
L-In-gr	Magistrate
L-Gr-In-B	Attorney
L-Gr	News reader
L-B-pr-in	Patent Attorney
L-B	Publisher
L-Pr-nu	Data typist
L-A-Gr-In	Film director
L-A-Pr	Photo-journalist
L-Sc	Science fiction writer

A = ARTISTIC PREFERENCE OR PREFERENCE FOR ART AND ART APPRECIATION

A-pr	Architectural draughtsman
A-pr	Artist
A-pr-sc-l	Cartographer
A-in-pr	Cartoonist
A-pr-in	Choreographer
A-pr	Colour consultant
A-b-pr	Commercial artist
A-pr-b	Confectioner
A-pr	Costume designer
A-pr	Decor designer
A-pr	Dress designer
A-pr-b	Interior decorator
A	Painter (art)
A-in	Portrait-painter
A-pr	Sculptor
A-pr-b	Shopwindow dresser
A-pr	Signwriter
A-pr	Textile designer
A-In-gr	Art teacher
A-In-b	Beautician
A-In-z	Occupational therapist
A-Gr-l	Ballet dancer
A-B-l	Advertisement canvasser
A-B-pr	Jeweller
A-L	Art critic
A-L	Art editor
A-L-Gr-In	Film Director
A-Pr	Baker
A-Pr-sc	Ceramics designer
A-Pr-sc-b	Copper smith
A-Pr-in	Hair dresser/stylist
A-Pr-sc	Gold smith
A-Pr-b	Graphic designer
A-Pr-nu	Industrial designer
A-Pr-sc	Jewelmaker
A-Pr-l-in-gr	Photographer
A-Pr-l-gr	Stage manager
A-Pr	Spraypainter
A-Sc-nu-pr	Architect
A-P-sc-pr	Landscape architect

Pr = PREFERENCE FOR PRACTICAL WORK (HANDWORK AND MACHINES / MACHINE-WORK)

Pr-in-z	Ambulance driver
Pr-z	Animal health technician
Pr	Assembly line worker
Pr-sc-nu	Automotive electrician
Pr-a	Automotive trimmer
Pr	Baker (Bread)
Pr-a-b	Barber
Pr	Bicycle mechanic
Pr-sc-a	Blacksmith
Pr	Blockman (butcher)
Pr-sc	Bloodtransfer technician
Pr-a-l	Bookbinder
Pr-a	Bricklayer
Pr-in-gr	Building foreman
Pr-gr-in-b	Building supervisor
Pr-gr-in	Bus driver
Pr-b-z	Butcher
Pr-sc	Cabinet joiner
Pr-a	Cabinet maker
Pr-sc-a	Cameraman
Pr-in	Caretaker
Pr	Carpenter
Pr	Charwoman
Pr-a-z-p	Chef
Pr	Cleaner
Pr-a	Compositor
Pr-nu-l	Computer operator
Pr-a-z-p	Cook
Pr-sc	Crane driver
Pr-sc	Dental technician
Pr-sc	Diesel fitter
Pr-sc	Diesel locomotive driver
Pr-sc	Diesel mechanic
Pr-a-b	Dressmaker
Pr-sc-nu	Electrician
Pr-sc-nu	Electro technician
Pr	Factory-hand
Pr-z-p	Farm worker
Pr-sc-gr	Fireman
Pr-b-z	Fisherman
Pr-sc-nu	Fitter and turner
Pr	Furniture polisher
Pr-sc	Geological assistant
Pr-sc-nu	Geotechnician
Pr-p	Grain grader
Pr-sc	Heavy vehicle driver
Pr-in	Housekeeper
Pr-sc-a	Inspector of works
Pr-a-nu	Joiner

Pr	Key maker
Pr	Labourer
Pr-a-sc	Lighting technician
Pr-sc	Locksmith
Pr-in	Luggage carrier
Pr	Machine-worker
Pr-sc	Machinist
Pr-z	Meat inspector
Pr-sc-nu	Mechanical technician
Pr-z-sc	Medical technician
Pr	Miner
Pr-a-nu-sc	Model builder
Pr-sc	Motor cycle mechanic
Pr-sc	Motor mechanic
Pr	Motor sheetmetal worker
Pr-sc-nu	Optical technician
Pr-z-in	Orthopedic technician
Pr-a	Panelbeater
Pr-sc-nu	Paper technologist
Pr-nu	Petrol pump attendant
Pr-sc-nu	Petroleum technologist
Pr-a	Piano-tuner
Pr-sc-nu	Plastics technologist
Pr-sc	Platelayer
Pr-sc-sc	Plumber
Pr-l-sc	Print mechanic
Pr	Projectionist
Pr-sc-nu	Radio technician
Pr-sc	Rigger
Pr	Road worker
Pr-a	Sail-maker
Pr	Saw-operator
Pr-in-gr	Security officer
Pr-a	Sewing machine operator
Pr	Sheetmetal worker
Pr-a	Shoemaker
Pr	Shunter
Pr	Smith
Pr-sc	Sound operator
Pr-sc-nu	Sound technician
Pr-l-a	Stage manager
Pr-nu-l	Storeman
Pr-in	Switchboard operator
Pr-sc-nu	Telecommunications technician
Pr-sc	Telephone technician
Pr-sc	Television technician
Pr-a	Theatre technician
Pr-sc	Toolmaker
Pr-a	Tracer
Pr-sc/a	Tradesman
Pr-sc	Train driver
Pr	Truck driver

Pr-a	Upholsterer
Pr-a	Wall and floor tiler
Pr-sc-a	Watch-maker
Pr-a	Welder
Pr-a	Wood-carver
Pr-z	Wool classer
Pr-In	Chauffeur
Pr-In-Gr-sc-a	Domestic science teacher
Pr-In-A	Make-up artist
Pr-In-Gr-a	Needle-work teacher
Pr-In-b	Taxi driver
Pr-In-Gr-L	Typing teacher
Pr-In-Gr-a	Woodwork teacher
Pr-Gr-in	Traffic officer
Pr-B-sc	Building contractor
Pr-B-sc	Dry cleaner
Pr-L	Printer
Pr-L	Typist
Pr-A	Coppersmith
Pr-A-sc	Diamond cutter
Pr-A	Engraver
Pr-A	Goldsmith
Pr-A-b	Hairdresser
Pr-A	Hat-maker
Pr-A-sc	Photo-1ithographer
Pr-A	Picture framer
Pr-A-sc	Potter
Pr-A	Silversmith
Pr-A-b	Tailor
Pr-Sc-a-nu	Boatbuilder
Pr-sc-b-nu	Concrete technologist
Pr-Sc	Instrument maker
Pr-Sc-nu	Instrument mechanist
Pr-Sc-nu	Laboratory technician
Pr-Sc-nu	Office machine technician
Pr-Z-P-sc	Agricultural technician
Pr-Z	Zoo assistant
Pr-P	Miller

Sc = PREFERENCE FOR THE NATURAL SCIENCES AND WORK OF A PHYSICAL SCIENTIFIC NATURE

Sc-in-z	Anaesthetist
Sc-pr	Bio-physicist
Sc-z-nu-p	Biochemist
Sc-in-z	Chemist
Sc-pr-nu	Explosives expert
Sc-pr-a	Fabric expert
Sc-z-p	Food scientist
Sc-z-pr-p	Food technologist
Sc-pr-z/p	Geologist
Sc-pr-nu	Hydrologist
Sc-nu-z	Medical researcher
Sc-nu-pr	Metallurgist
Sc-nu	Metereologist
Sc-nu-pr	Mineralogist
Sc-pr-nu	Oceanographer
Sc-pr	Paint technician
Sc-z-pr-in	Radiographer
Sc-pr	Rubber technologist
Sc-nu	Seismologist
Sc-p-pr	Soil scientist
Sc-pr-p	Sugar technologist
Sc-pr-a	Textile technologist
Sc-p-pr	Wine-maker
Sc-In-z	Optician
Sc-In-Gr-nu	Physical science teacher
Sc-B-In-z	Pharmacist
Sc-Nu-pr	Aeronautical engineer
Sc-Nu-pr-z/p	Agricultural engineer
Sc-Nu	Astronomer
Sc-Nu-pr-z	Biomedical engineer
Sc-Nu-pr	Chemical engineer
Sc-Nu-pr	Civil engineer
Sc-Nu-pr	Electrical engineer
Sc-Nu-pr	Engineer (General)
Sc-Nu-pr	Geophysicist
Sc-Nu-b-pr	Industrial engineer
Sc-Nu-pr	Mechanical engineer
Sc-Nu-pr	Metallurgical engineer
Sc-Nu-pr	Mining engineer
Sc-Nu-pr	Nuclear research scientist
Sc-Nu-pr	Physicist
Sc-L-in-gr	Geographer
Sc-Pr-a-z/p	Home economist

Sc-Z-p	Bacteriologist
Sc-Z-pr-in	Health inspector
Sc-Z	Medical pathologist
Sc-Z-pr	Medical technologist
Sc-P-pr	Wood scientist

Z = PREFERENCE FOR ANIMALS, ZOOLOGY AND RELATED BIOLOGICAL SCIENTIFIC WORK

Z-sc	Animal physiologist
Z-in-pr	Animal welfare official
Z-nu-sc	Audiometrist
Z-sc-pr-in	Biokinetician
Z-b-p-pr	Cattle and sheep farmer
Z-sc-in-pr	Dentist
Z-pr	Dog-master (Dog-handler)
Z-sc	Entomologist
Z-pr-p	Game-warden
Z-pr	Jockey
Z-sc-p-pr	Marine biologist
Z-p	Ornithologist
Z-l	Pound-master
Z	Ranger
Z-pr	Stock-inspector
Z-pr	Trainer (horses)
Z-pr	Veterinary nurse
Z-sc-in-pr	Veterinary surgeon
Z-sc-pr	Veterinary technologist
Z-sc	Zoologist
Z-In	Chiropractor
Z-In-pr	First-aid officer
Z-In-pr-sc	Nurse
Z-In-sc	Optometrist
Z-In-sc-pr	Orthopaedic surgeon
Z-In-sc	Paediatrician
Z-In-Gr	Phys Ed. teacher
Z-In-pr-sc	Physiotherapist
Z-P-In-sc	Agricultural counsellor
Z-P-sc-pr	Agriculturist
Z-P-In-Gr-sc	Biology teacher
Z-P-gr-in	Farm foreman
Z-P-b-pr	Farmer
Z-P-sc-pr	Nature conservationist
Z-Pr-sc	Taxidermist
Z-Sc-In	Dermatologist
Z-Sc-in-p	Dietician

Z-Sc-p-nu-pr	Microbiologist
Z-Sc	Physiologist
Z-Pr-in-sc	Surgeon
Z-B-nu	Live stock speculator

P = PREFERENCE FOR PLANTS, BOTANICAL AND HORTICULTURAL WORK

P-r-sc	Agronomist
P-sc	Botanist
P-gr-sc-z-in-l	Botany lecturer
P-pr-z-sc	Forrestry scientist
P-l-nu	Forrestry clerk
P-b-sc-pr	Fruit-farmer
P-sc	Fruit-technologist
P-pr	Gardener
P-b-sc-pr	Grain-farmer
P-pr-a	Horticulturist
P-a-pr	Landscape gardener
P-pr-sc-b	Nurseryman
P-in-l-z	Parks and recreation administrator
P-sc-z	Phytopathologist
P-sc-pr-z	Plant physiologist
P-b-sc-pr	Vegetable-farmer
P-sc-pr	Viticulturist
P-In-Gr-z	Parks and recreation officer
P-A-b-in	Florist
P-A-sc	Landscape architect
P-Pr-z	Forrester
P-Pr	Ground superintendent
P-Pr	Tree trimmer
P-B-in	Fruit vendor
P-B-in	Vegetable vendor
P-Z-Gr-Gr-sc	Biology teacher

13. MB-10 NORM TABLES

Table 9: Norms for first year males (n = 1062)

X	In	Gr	B	Nu	L	A	Pr	Sc	Z	P	X
0	0	3	1	2	4	4	1	2	2	7	0
1	1	8	3	6	10	11	4	5	6	19	1
2	2	12	6	8	17	18	8	7	10	28	2
3	4	16	9	12	25	26	13	11	14	38	3
4	8	22	13	15	33	34	21	16	18	47	4
5	11	27	18	18	40	42	27	20	25	52	5
6	15	32	21	21	47	51	33	23	30	57	6
7	19	38	25	25	53	57	39	26	35	64	7
8	25	44	28	27	60	63	44	31	42	69	8
9	32	48	31	31	66	68	48	34	46	73	9
10	39	52	35	34	70	72	52	38	50	76	10
11	44	57	37	37	74	76	56	42	54	80	11
12	50	60	40	42	78	80	59	46	58	83	12
13	54	65	44	44	81	82	63	48	62	85	13
14	59	69	48	48	85	85	66	51	66	87	14
15	63	73	51	51	86	88	70	56	69	87	15
16	68	76	54	54	88	90	72	58	71	90	16
17	71	78	56	59	91	92	74	61	74	91	17
18	76	80	58	62	93	92	78	63	76	92	18
19	80	83	60	65	94	93	80	66	78	93	19
20	82	85	62	69	95	94	83	68	81	94	20
21	84	87	65	71	96	95	84	71	84	94	21
22	87	89	67	74	97	96	87	72	86	95	22
23	90	90	69	76	97	97	89	75	88	96	23
24	92	92	72	79	98	97	91	78	89	97	24
25	93	93	75	83	98	97	92	80	90	97	25
26	94	94	77	85	99	98	93	82	92	97	26
27	96	95	80	87	99	98	95	85	93	98	27
28	97	96	83	89	99	99	97	88	94	98	28
29	98	97	86	91	99	99	97	91	95	98	29
30	99	98	90	93	100	99	98	93	96	99	30
31	99	98	92	95	100	100	98	96	97	99	31
32	99	99	94	97	100	100	99	97	98	99	32
33	100	99	97	98	100	100	99	98	99	100	33
34	100	99	98	99	100	100	100	99	99	100	34
35	100	99	99	100	100	100	100	100	100	100	35
36	100	100	100	100	100	100	100	100	100	100	36

Table 10: Norms for first year females (n = 851)

X	In	Gr	B	Nu	L	A	Pr	Sc	Z	P	X
0	0	2	2	9	1	1	2	5	1	4	0
1	0	4	6	18	2	2	7	11	3	12	1
2	0	7	10	28	4	6	17	18	7	20	2
3	1	11	18	35	7	8	26	24	11	30	3
4	2	16	23	41	12	12	35	29	15	39	4
5	2	19	29	46	17	18	45	36	21	49	5
6	4	23	37	50	21	21	54	41	26	56	6
7	5	27	41	56	24	26	62	47	32	62	7
8	6	32	46	59	29	31	68	52	36	68	8
9	7	35	49	62	36	36	74	56	42	73	9
10	9	39	53	65	41	40	78	60	46	76	10
11	11	44	58	69	47	44	82	64	50	80	11
12	13	49	60	72	52	49	87	67	53	82	12
13	16	53	63	74	57	53	90	71	56	85	13
14	19	57	65	77	64	56	92	73	60	88	14
15	23	62	69	79	68	59	94	76	64	90	15
16	27	65	71	81	72	64	96	78	67	91	16
17	31	69	74	82	76	69	97	80	71	93	17
18	35	73	76	83	79	72	98	83	75	94	18
19	38	76	78	85	81	75	99	85	77	95	19
20	43	79	80	87	84	79	99	87	79	96	20
21	48	82	81	88	87	82	99	88	81	96	21
22	53	85	83	90	89	84	100	90	85	97	22
23	59	87	85	91	90	87	100	91	87	97	23
24	65	90	87	92	92	89	100	92	89	98	24
25	68	91	89	93	94	92	100	93	90	98	25
26	73	93	90	94	96	93	100	95	91	99	26
27	77	95	91	95	96	94	100	96	93	99	27
28	83	95	94	96	97	95	100	96	95	99	28
29	87	97	95	97	98	96	100	98	96	100	29
30	89	97	97	98	98	97	100	98	97	100	30
31	92	98	98	98	99	98	100	99	97	100	31
32	95	99	98	98	100	99	100	99	98	100	32
33	97	100	99	99	100	99	100	100	99	100	33
34	99	100	100	100	100	100	100	100	99	100	34
35	99	100	100	100	100	100	100	100	100	100	35
36	100	100	100	100	100	100	100	100	100	100	36

Table 11: Norms for Grade 9 and Grade 11 boys

X	In	Gr	B	Nu	L	A	Pr	Sc	Z	P	X
0	0	1	0	2	3	1	0	0	2	6	0
1	0	4	1	7	6	4	2	2	8	16	1
2	2	7	2	11	12	8	3	5	12	27	2
3	3	10	3	16	19	14	6	8	18	37	3
4	6	14	5	20	26	21	11	13	22	45	4
5	9	19	8	25	35	28	16	17	25	52	5
6	12	23	11	30	42	35	21	21	31	57	6
7	17	26	14	35	50	45	24	24	36	63	7
8	23	33	20	39	58	51	29	29	37	69	8
9	29	39	24	44	62	59	37	34	46	71	9
10	35	48	27	49	67	65	42	40	52	75	10
11	41	52	30	54	73	71	49	47	56	79	11
12	48	58	34	59	77	76	54	51	60	82	62
13	54	62	38	61	82	81	60	56	63	84	13
14	61	67	41	65	87	85	64	61	65	85	14
15	67	72	44	68	89	87	67	64	68	87	15
16	71	76	48	71	92	89	72	68	73	89	16
17	77	80	51	73	94	91	76	71	75	91	17
18	81	84	54	75	95	91	79	73	76	92	18
19	85	86	56	77	96	93	81	77	79	93	19
20	88	89	60	79	96	93	84	79	81	94	20
21	91	90	62	82	97	95	86	82	83	95	21
22	93	92	64	83	98	96	88	84	85	97	22
23	94	93	67	86	98	97	88	86	85	98	23
24	95	94	70	89	99	97	90	87	87	99	24
25	96	96	73	91	99	98	92	90	88	99	25
26	97	97	75	92	99	98	92	91	89	100	26
27	98	97	78	93	99	99	93	92	91	100	27
28	98	97	82	93	100	99	94	93	93	100	28
29	99	98	85	95	100	99	95	95	94	100	29
30	99	99	89	96	100	99	96	96	95	100	30
31	99	99	92	98	100	100	98	97	96	100	31
32	100	100	94	98	100	100	99	99	98	100	32
33	100	100	97	99	100	100	100	99	99	100	33
34	100	100	98	99	100	100	100	99	100	100	34
35	100	100	99	99	100	100	100	100	100	100	35
36	100	100	100	100	100	100	100	100	100	100	36

Table 12: Norms for Grade 9 and Grade 11 girls

X	In	Gr	B	Nu	L	A	Pr	Sc	Z	P	X
0	0	0	0	5	0	1	1	4	1	4	0
1	0	1	1	12	1	1	6	10	5	9	1
2	0	2	2	19	1	3	16	18	10	15	2
3	0	4	4	27	2	6	25	26	14	31	3
4	1	5	6	36	5	9	35	34	20	39	4
5	1	7	9	42	8	15	46	41	25	50	5
6	1	9	14	48	13	20	56	49	360	59	6
7	2	12	18	55	15	27	65	55	35	64	7
8	3	15	21	60	23	34	71	59	41	68	8
9	4	19	28	64	26	41	77	65	46	72	9
10	6	25	32	70	35	48	82	69	51	77	10
11	8	30	37	74	42	55	86	73	56	81	11
12	9	34	41	77	49	61	89	77	59	85	12
13	12	39	47	80	56	67	91	81	63	88	13
14	14	45	51	82	64	72	94	83	66	89	14
15	18	51	56	85	69	75	95	84	70	91	15
16	21	57	59	87	74	79	97	87	74	92	16
17	26	63	62	89	78	81	97	89	77	93	17
18	31	69	66	91	84	83	98	90	79	93	18
19	37	74	69	92	87	84	99	92	81	95	19
20	42	77	74	93	91	86	99	93	83	95	20
21	48	80	76	93	94	87	99	94	86	96	21
22	53	84	80	95	95	89	100	96	89	96	22
23	59	88	84	95	96	90	100	97	89	98	23
24	64	92	85	95	98	91	100	97	90	98	24
25	70	93	89	96	98	93	100	98	91	98	25
26	74	96	90	97	99	94	100	98	93	99	26
27	78	96	93	97	99	95	100	98	93	99	27
28	83	97	94	98	99	96	100	99	95	100	28
29	87	97	96	99	99	97	100	99	96	100	29
30	92	98	98	99	99	98	100	100	97	100	30
31	95	99	99	100	100	99	100	100	98	100	31
32	97	100	100	100	100	99	100	100	98	100	32
33	99	100	100	100	100	100	100	100	98	100	33
34	100	100	100	100	100	100	100	100	100	100	34
35	100	100	100	100	100	100	100	100	100	100	35
36	100	100	100	100	100	100	100	100	100	100	36

Table 13: Norms for Grade 7 boys (n = 930)

X	In	Gr	B	Nu	L	A	Pr	Sc	Z	P	X
0	0	0	0	0	1	0	0	0	1	3	0
1	0	1	0	1	3	2	0	0	3	9	1
2	1	2	0	2	8	4	0	1	5	15	2
3	2	4	1	3	12	6	1	2	9	22	3
4	5	6	3	6	17	10	3	3	13	27	4
5	7	10	4	8	23	14	4	4	16	32	5
6	12	15	6	13	29	19	7	7	22	38	6
7	18	19	9	18	34	25	10	12	27	44	7
8	29	24	14	23	42	33	14	15	33	51	8
9	36	32	18	31	50	41	20	23	40	58	9
10	48	43	25	38	57	49	26	30	45	65	10
11	54	54	32	48	65	58	35	39	52	71	11
12	64	65	41	56	72	66	44	46	59	96	12
13	72	73	49	65	78	72	54	53	63	82	13
14	80	81	59	71	83	80	61	61	67	86	14
15	86	87	66	76	89	84	68	67	71	88	15
16	91	91	71	82	93	89	75	71	75	91	16
17	94	93	75	85	95	91	80	75	77	92	17
18	96	95	79	87	96	93	83	78	80	95	18
19	97	96	83	88	97	95	87	80	83	96	19
20	98	97	86	89	99	96	89	83	85	97	20
21	99	98	88	91	99	97	90	85	87	97	21
22	99	99	90	92	100	97	91	87	87	98	22
23	100	99	92	93	100	98	92	89	89	98	23
24	100	99	94	94	100	98	94	90	90	99	24
25	100	99	95	95	100	99	95	92	91	99	25
26	100	100	96	96	100	99	95	93	92	99	26
27	100	100	97	97	100	99	97	94	94	99	27
28	100	100	97	97	100	100	97	95	95	99	28
29	100	100	98	98	100	100	98	96	95	99	29
30	100	100	99	99	100	100	99	97	97	100	30
31	100	100	100	99	100	100	99	98	98	100	31
32	100	100	100	99	100	100	99	99	99	100	32
33	100	100	100	100	100	100	100	99	99	100	33
34	100	100	100	100	100	100	100	100	99	100	34
35	100	100	100	100	100	100	100	100	100	100	35
36	100	100	100	100	100	100	100	100	100	100	36

Table 14: Norms for Grade 7 girls (n = 993)

X	In	Gr	B	Nu	L	A	Pr	Sc	Z	P	X
0	0	0	0	1	0	0	1	1	1	4	0
1	0	0	1	4	1	6	4	3	3	10	1
2	0	1	3	7	2	2	9	6	8	16	2
3	0	1	4	11	3	3	15	9	14	23	3
4	0	3	6	15	5	5	23	13	20	30	4
5	1	3	10	19	7	8	29	18	27	37	5
6	2	6	14	23	10	11	39	24	32	42	6
7	5	9	19	29	14	16	47	30	38	51	7
8	5	13	24	35	19	24	55	36	44	57	8
9	8	18	32	42	25	32	64	44	51	64	9
10	11	25	39	50	31	39	71	52	57	70	10
11	16	31	46	58	38	47	77	59	61	75	11
12	22	38	54	64	48	55	82	66	65	80	62
13	28	47	62	70	54	62	86	72	68	83	13
14	36	56	68	76	61	71	91	77	71	87	14
15	44	63	73	80	67	76	94	80	73	88	15
16	50	69	78	82	75	81	95	83	76	81	16
17	57	74	82	86	81	84	97	87	77	93	17
18	63	79	85	88	86	87	98	89	80	94	18
19	70	83	88	90	90	89	99	91	81	95	19
20	74	86	91	92	93	91	99	92	83	96	20
21	80	90	93	93	96	93	100	94	84	97	21
22	84	93	95	94	97	95	100	95	86	98	22
23	88	95	96	95	98	96	100	96	87	99	23
24	90	96	96	96	99	96	100	96	89	99	24
25	92	97	98	96	99	98	100	97	90	99	25
26	95	98	99	97	100	98	100	98	92	99	26
27	97	99	99	98	100	98	100	98	94	100	27
28	98	99	100	98	100	99	100	98	94	100	28
29	99	100	100	99	100	99	100	98	96	100	29
30	99	100	100	99	100	100	100	99	97	100	30
31	99	100	100	99	100	100	100	99	98	100	31
32	100	100	100	100	100	100	100	99	98	100	32
33	100	100	100	100	100	100	100	100	99	100	33
34	100	100	100	100	100	100	100	100	100	100	34
35	100	100	100	100	100	100	100	100	100	100	35
36	100	100	100	100	100	100	100	100	100	100	36

14. MB-10: MODEL FOR COMBINATIONS AND ORDER OF QUESTIONS

#				#				#				#			
1	1,	10,	9	**31**	6,	5,	3	**61**	7,	6,	1	**91**	3,	1,	6
2	3,	1,	9	**32**	3,	2,	10	**62**	9,	8,	3	**92**	10,	9,	4
3	4,	3,	1	**33**	5,	4,	10	**63**	10,	9,	3	**93**	5,	2,	9
4	5,	4,	1	**34**	10,	9,	6	**64**	10,	7,	4	**94**	8,	6,	4
5	1,	10,	7	**35**	8,	7,	3	**65**	1,	10,	3	**95**	8,	6,	3
6	7,	6,	4	**36**	1,	10,	5	**66**	10,	9,	2	**96**	1,	10,	8
7	3,	1,	7	**37**	9,	8,	4	**67**	4,	3,	2	**97**	9,	7,	2
8	4,	3,	9	**38**	9,	7,	5	**68**	5,	4,	2	**98**	6,	5,	4
9	9,	3,	8	**39**	4,	3,	6	**69**	10,	8,	6	**99**	6,	5,	10
10	5,	3,	8	**40**	6,	4,	1	**70**	2,	10,	7	**100**	2,	1,	4
11	10,	8,	5	**41**	5,	4,	3	**71**	2,	1,	6	**101**	2,	1,	8
12	6,	5,	1	**42**	1,	8,	5	**72**	6,	4,	2	**102**	4,	2,	7
13	3,	2,	7	**43**	9,	7,	4	**73**	7,	6,	10	**103**	9,	6,	3
14	10,	8,	3	**44**	9,	8,	7	**74**	9,	8,	2	**104**	3,	2,	6
15	2,	1,	5	**45**	7,	6,	9	**75**	8,	6,	1	**105**	8,	7,	10
16	6,	3,	10	**46**	7,	6,	5	**76**	6,	4,	10	**106**	4,	3,	7
17	8,	6,	2	**47**	6,	5,	2	**77**	10,	9,	8	**107**	6,	4,	9
18	2,	9,	6	**48**	3,	2,	8	**78**	4,	2,	8	**108**	5,	3,	10
19	1,	9,	7	**49**	2,	1,	7	**79**	6,	5,	9	**109**	5,	4,	8
20	1,	9,	6	**50**	10,	9,	5	**80**	2,	10,	5	**110**	3,	1,	8
21	7,	6,	3	**51**	10,	8,	4	**81**	7,	5,	1	**111**	9,	7,	3
22	7,	6,	2	**52**	6,	5,	8	**82**	7,	5,	3	**112**	9,	8,	1
23	5,	4,	9	**53**	4,	1,	8	**83**	7,	5,	2	**113**	3,	2,	9
24	1,	9,	5	**54**	3,	2,	5	**84**	2,	10,	6	**114**	8,	7,	2
25	1,	9,	4	**55**	3,	10,	7	**85**	8,	7,	4	**115**	4,	3,	8
26	5,	4,	7	**56**	3,	2,	1	**86**	8,	5,	2	**116**	2,	1,	10
27	1,	10,	4	**57**	4,	2,	10	**87**	2,	10,	8	**117**	5,	3,	9
28	8,	7,	1	**58**	2,	1,	9	**88**	10,	9,	7	**118**	5,	3,	1
29	8,	7,	6	**59**	4,	2,	9	**89**	9,	8,	6	**119**	1,	10,	6
30	7,	5,	10	**60**	4,	3,	10	**90**	8,	7,	5	**120**	7,	4,	1