MBTI® Step I instrument

European Data Supplement

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Contents

Introduction and overview

OPP Ltd is the European distributor of the MBTI® Step I instrument, and over the last decade has embarked on a programme to develop and launch additional European language versions of the instrument. At the time of writing, the MBTI Step I instrument is commercially available in 14 European languages, with one further language version under development.

This European data supplement has been written to provide MBTI Step I users with a single source of information containing a summary of the research data gathered for European language versions of the MBTI Step I questionnaire. As such, it includes a combination of new (not previously published) research, alongside information drawn from existing sources. The aim has been to produce a single, easily accessible resource that will better serve multilingual use of the instrument, written in a format that will allow it to be easily updated as more data become available.

The supplement has been split into discrete chapters, with each language version of the questionnaire having its own dedicated chapter. The aim is that each chapter can be read as a stand-alone document, and hence there is some duplication of text across each one. The structure of the supplement will allow existing chapters to be updated as more data become available, and new sections to be added as further language versions of the questionnaire are launched.

What is included in this supplement

The supplement contains information on Step I type distributions, reliability, validity and group differences for the following language versions:

- Danish
- Dutch
- English (European)
- French
- German
- Swedish.

It contains the equivalent information for the following language versions, with the exception of best-fit validity (as these data are not yet available):

- Finnish
- Italian
- Norwegian
- Spanish.

It also provides a summary of the initial research conducted during the development of the following language versions:

- Polish
- Russian.

Due to insufficient data having been collected to date, the following language versions have not been included in the first edition of this supplement:

- Greek
- Portuguese
- Turkish (not yet commercially launched).

Overview of findings

What follows is a short summary of several of the key findings. These and other findings are presented in more detail in the relevant language chapter of this supplement. The data described within this supplement show the psychometric properties of the instrument to be credible, and demonstrate a high degree of consistency across the various European language versions of the Step I questionnaire.

Type distributions

Type distributions are presented within the supplement for each language version of the questionnaire. These will be of particular interest to MBTI users who work with groups of people who complete the questionnaire in different languages. The distributions are presented but are not discussed in great detail. For a more detailed discussion of psychological type and culture, readers are referred to *Type and Culture; Using the MBTI® Instrument in International Applications* (Kirby, Kendall and Barger, 2007), which is available from OPP Ltd.

Table 1.1 below shows a comparison of the distributions from samples that are considered representative of the groups of people with whom the MBTI instrument has been and will be used for applications such as management development, coaching, counselling and teambuilding. The degree of similarity across language versions is quite striking. This provides strong evidence to suggest that the psychological type of managers and professionals follows a very consistent pattern in the countries from which we have data.

Table 1.1: Similarities in preference distributions across language versions

Language version	Proportion (%)							
	E	I	S	N	T	F	J	P
Danish (n=13,561)	75	25	58	42	76	24	62	38
Dutch (n=13,430)	74	26	56	44	70	30	54	46
English (European) (n=167,824)	75	25	58	42	76	24	62	38
Finnish (n=665)	72	28	53	47	83	17	74	26
French (n=8,038)	64	36	59	41	70	30	66	34
German (n=11,515)	72	28	54	46	81	19	73	27
Italian (n=1,987)	66	34	57	43	76	24	75	25
Norwegian (n=915)	80	20	68	32	85	15	69	31
Spanish (n=1,527)	76	24	62	38	92	8	76	24
Swedish (n=1,817)	77	23	59	41	66	34	61	39
Median	74.5	25.5	58	42	76	24	67.5	32.5

The data gathered from across language versions for this sample of people is summarised in the form of a type table below. Type tables are a way of illustrating the proportion of each type within a particular group. The data show ESTJ (21%) and ENTJ (14%) to be the most frequently occurring types amongst this group.[1]

Table 1.2: Type table for whole sample across language versions (n=221,279)

ISTJ	ISFJ	INFJ	INTJ
n=26,746 12.1%	n=6,034 2.7%	n=2,944 1.3%	n=11,555 5.2%
ISTP	**ISFP**	**INFP**	**INTP**
n=7,323 3.3%	n=1,917 0.9%	n=3,486 1.6%	n=10,206 4.6%
ESTP	**ESFP**	**ENFP**	**ENTP**
n=12,717 5.7%	n=4,765 2.2%	n=11,542 5.2%	n=23,430 10.6%
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=45,970 20.8%	n=13,351 6.0%	n=9,374 4.2%	n=29,919 13.5%

Type	n	%
E	151,068	68.3%
I	70,211	31.7%
S	118,823	53.7%
N	102,456	46.3%
T	167,866	75.9%
F	53,413	24.1%
J	145,893	65.9%
P	75,386	34.1%

Reliability

The reliability of a test or questionnaire relates to how consistent and precise it is. Internal consistency reliability addresses the question of whether all the questions in a scale measure the same construct. A common measure of internal consistency reliability is coefficient alpha (Cronbach, 1951).

The alpha coefficients for the managerial and professional samples discussed above are shown in Table 1.3, together with the size of each sample. It is generally agreed that internal consistency reliability should achieve a value of at least 0.7 for a test to be considered to be reliable.[2] On this basis, all the dimensions of the questionnaire show good internal consistency reliability in all languages.

[1] It should be noted that over 75% of the group completed the European English language version of the questionnaire, so the type table will reflect this.
[2] For example, see Nunnally (1978) or Kline (2000).

Table 1.3: Internal consistency reliability

Language version	Alpha coefficient			
	E–I	S–N	T–F	J–P
Danish (n=13,561)	0.84	0.82	0.74	0.81
Dutch (n=13,430)	0.85	0.77	0.80	0.83
English (European) (n=167,824)	0.85	0.82	0.81	0.83
Finnish (n=665)	0.86	0.78	0.78	0.80
French (n=8,038)	0.84	0.79	0.75	0.80
German (n=11,515)	0.83	0.72	0.77	0.79
Italian (n=1,987)	0.81	0.75	0.74	0.78
Norwegian (n=915)	0.84	0.80	0.72	0.80
Polish (n=271)	0.86	0.77	0.82	0.80
Russian (n=201)	0.77	0.71	0.76	0.80
Spanish (n=1,527)	0.83	0.79	0.73	0.79
Swedish (n=1,817)	0.82	0.72	0.76	0.79
Median	0.84	0.78	0.76	0.80

Intercorrelations between MBTI dimensions

One of the original aims of developing the MBTI questionnaire was to see if dimensions could be produced that were independent of each other. Previous results from other language versions have shown that this was achieved with all dimensions except between Sensing–Intuition and Judging–Perceiving.

During these latest analyses, only very low correlations have been found between most of the dimensions. However, the S–N/J–P relationship that has been found previously has been replicated across language versions, showing that a preference for Sensing is likely to be associated with a preference for Judging, and that a preference for Intuition is likely to be associated with a preference for Perceiving.

Validity

The aim of the MBTI instrument is to help individuals to establish their validated or 'best-fit' psychological type. A key measure of the validity of the instrument is, therefore, how well the results relate to best-fit (validated) type.

Table 1.4 presents the results of the analyses conducted to compare reported type with best-fit type across the different language versions.[3] The results show that around 90% of people agree with three or more of their reported dimensions, with between 48% and 72% agreeing with all four letters. When this is broken down to the individual dimensions, it is found that approximately 90% agree with each of their reported dimension preferences. This provides good

[3] Two sets of results are shown each for the Dutch, French and German language versions, summarising the results of two separate studies that have been conducted for each of these language versions.

evidence for the accuracy of the instrument across the language versions for which we have data. Note that where data are not presented for a particular language version, it is because the necessary data are not yet available.

Table 1.4: Comparison of reported and best-fit type results

Language version		Respondents agreeing with total numbers of dimensions (%)					Respondents agreeing with each particular dimension (%)			
		4	3	2	1	0	E–I	S–N	T–F	J–P
Danish	(n=221)	56.1	35.7	6.8	0.9	0.5	91.4	90.0	75.6	89.1
	(n=183)	71.0	24.6	3.8	0.5	0.0	93.4	87.4	90.2	95.1
Dutch	(n=199)	71.9	21.1	6.0	1.0	0.0	91.5	91.0	87.4	94.0
	(n=197)	71.6	21.3	5.6	1.0	0.5	89.8	92.4	89.8	90.4
English (European)	(n=386)	71.5	21.5	6.1	0.3	0.3	92.1	93.8	88.4	89.0
French	(n=578)	67.8	25.3	6.1	0.7	0.2	90.1	91.0	88.3	90.6
	(n=363)	62.3	31.1	4.9	1.7	0.0	89.8	91.6	86.8	86.8
German	(n=323)	59.8	28.8	9.9	1.2	0.3	90.1	84.5	84.8	87.0
	(n=110)	62.7	30.9	5.5	0.9	0.0	93.6	87.3	87.3	87.3
Polish	(n=271)	48.3	30.6	16.2	4.1	0.8	84.5	81.2	79.3	76.8
Russian	(n=201)	57.7	26.9	10.4	4.5	0.5	89.6	86.1	79.6	81.6
Swedish	(n=70)	59.0	34.0	7.0	0.0	0.0	94.0	79.0	90.0	88.0
Median		62.5	27.9	6.1	1.0	0.3	90.8	88.7	87.4	88.5
Median (at least three dimensions agreed)		93.0								

The results of additional construct validity research conducted using the English (European) and Swedish versions of the questionnaire have demonstrated that respondents of different types have preferences for different types of organisational cultures and jobs that are consistent with what we would expect from type theory, and that scores on the MBTI Step I dimensions show clear relationships in the expected direction with scores on other instruments that measure related psychological constructs.

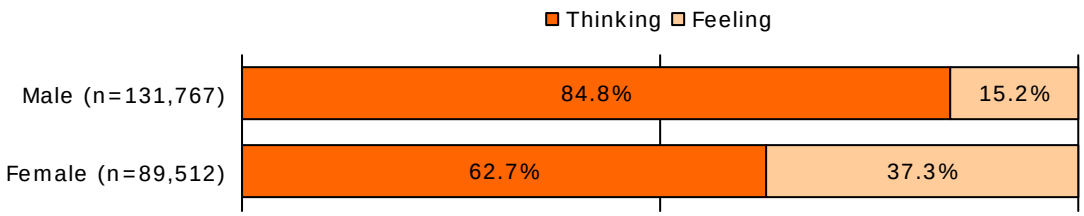
Group differences

Analyses were conducted to explore links between MBTI type and various demographic variables. These variables included gender, age, age at which the person left full-time education, occupational level, work area, nationality and employment status. By way of summary, the group differences results for the whole sample across language versions are described below. Note that over 75% of the group completed the European English language version of the questionnaire, so the results will reflect this. There were many interesting findings for the different language versions, and the reader is therefore invited to refer to the individual chapters for further details.

Gender

Across the whole sample, there is a significant gender difference on the Thinking–Feeling dimension, as shown in Figure 1.1 below:[4]

Figure 1.1: Gender differences on the T–F dimension



Thinking preferences are over-represented amongst men and Feeling preferences are over-represented amongst women. This effect has been found many times with many different language versions of the MBTI instrument in a number of different cultures.

Age

Previous research using UK Step I continuous scores has shown significant correlations between age and three of the four dimensions (Warr, Miles and Platts, 2001). Older people were more likely than younger people to have preferences for Introversion, Sensing and Judging.

The data in this supplement were analysed in a slightly different way, by looking for differences in average age between people with preferences for Extraversion versus those with preferences for Introversion, Sensing versus Intuition, Thinking versus Feeling and Judging versus Perceiving. An analysis of the data from the whole OPPassessment sample showed a statistically significant and meaningful relationship between age and only one of the dimensions,[5] as shown in Table 1.5. The mean age of people with a preference for Introversion was approximately 1¼ years higher than of those with a preference for Extraversion. Although statistically significant, the difference is still small in real terms. Differences for the other three dimensions were in the region of 6 months or less.

[4] Significant at $p<0.001$, based on the results of chi-square analysis (often abbreviated to χ^2). Chi-square analysis is a technique used to explore whether observed frequency distributions differ significantly from other, pre-defined, distributions.
[5] Significant at $p<0.001$, based on the results from independent-samples t-tests.

Table 1.5: Significant mean age differences

	Extraversion	Introversion	Difference	Significance
Mean age (years)	37.02	38.26	1.24	***

***Difference significant at p<0.001.

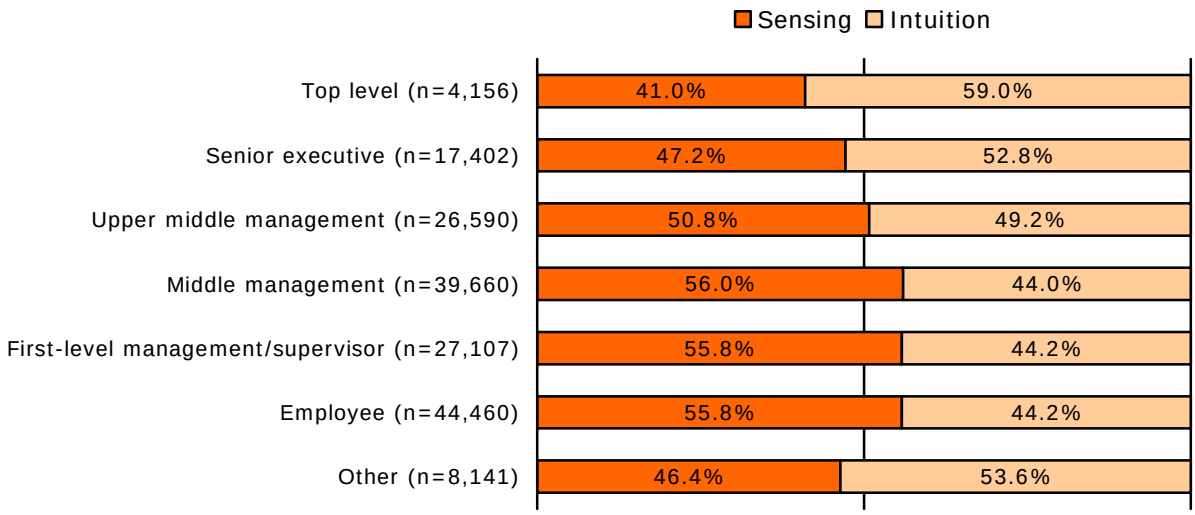
Occupational level

Previous research has demonstrated that individuals in higher-level jobs in organisations are more likely to have preferences for Intuition and for Thinking than those in lower-level jobs (Quenk, Hammer and Majors, 2004).

This is reflected in the relationship of the Sensing–Intuition and Thinking–Feeling dimensions with occupational level in the OPPassessment sample.

The data suggest that individuals at the top occupational level are most likely to have a preference for Intuition, followed by senior executives and upper middle management. The proportions of people with preferences for Intuition were lowest amongst people from middle management down to employee level, as shown in Figure 1.2.

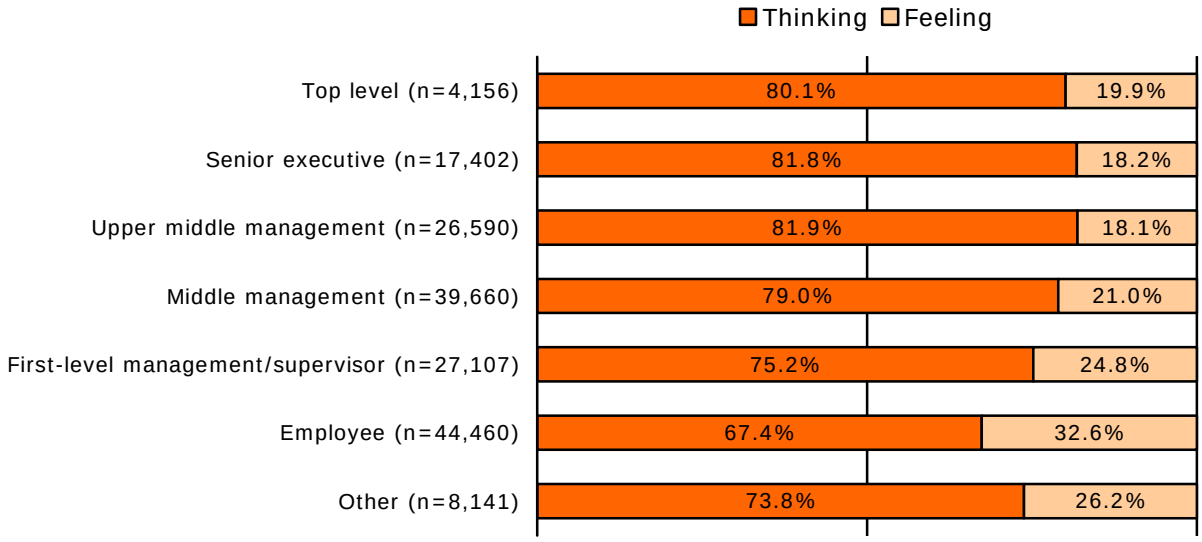
Figure 1.2: Sensing–Intuition[6] and occupational level



It was also found that those with preferences for Thinking are slightly under-represented at employee level and (to some extent) first-level management/supervisor level, as shown in Figure 1.3. All other occupational levels contained a similar (higher) proportion of Thinking types.

[6] χ^2=1,240.82; significant at p<0.001.

Figure 1.3: Thinking–Feeling[7] and occupational level



Education

Specific educational qualification data were not collected for the OPPassessment sample; however, the age at which individuals left full-time education was. Those who left full-time education at an older age were significantly more likely to have preferences for Extraversion, Intuition, Thinking and/or Perceiving.[8] However, whilst statistically significant, the differences were all less than one year in real terms.

Work area

Previous type research suggests that an individual's type influences their choice of career (Hammer, 1998), and indeed the data in this supplement show there is a statistically significant relationship between each of the dimensions and job type. In the figures that follow, the five most common work areas have been re-ordered according to the percentage of E, S, T or J.

[7] χ^2=2,858.38; significant at $p<0.001$.
[8] Independent-samples t-test; all significant at $p<0.001$.

Figure 1.4: Extraversion–Introversion[9] and work area

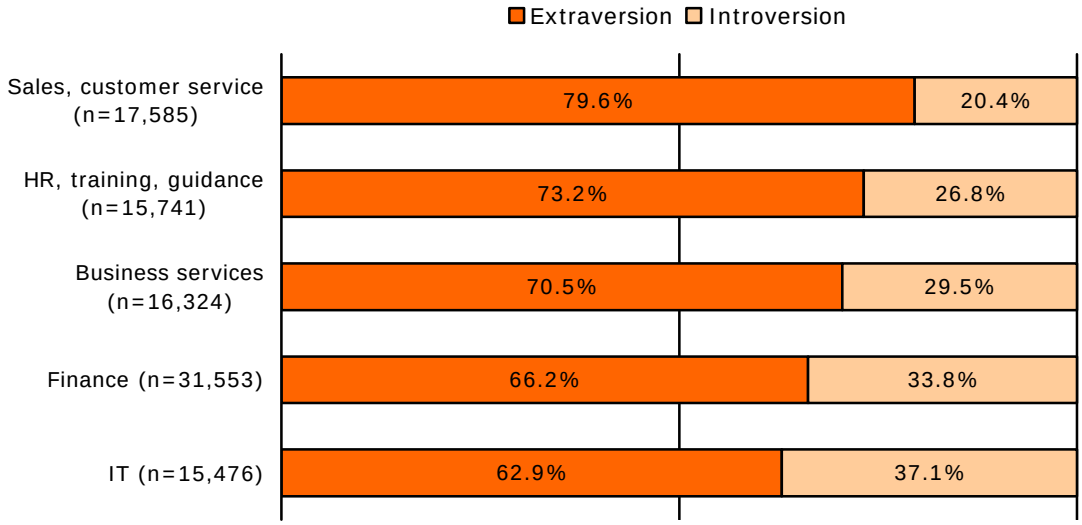
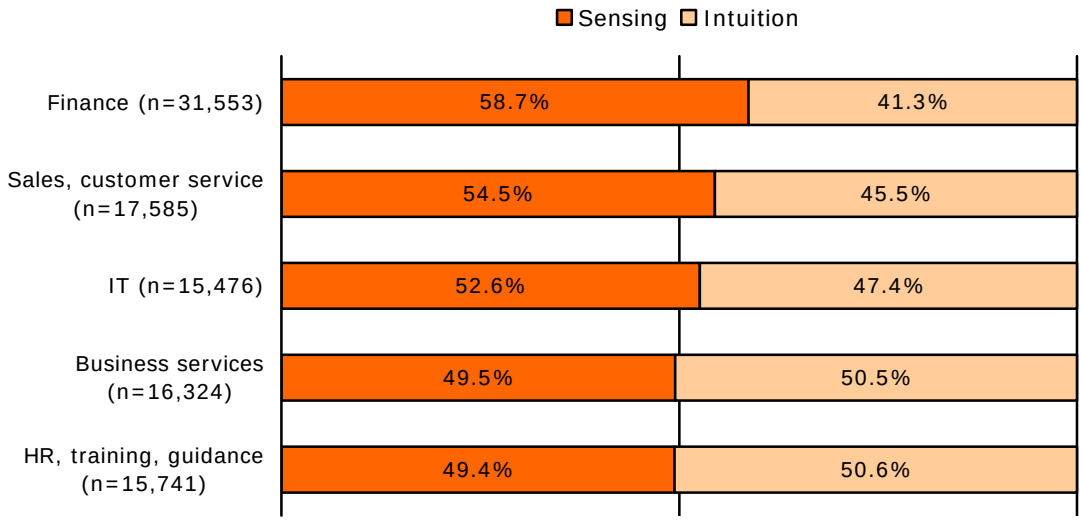


Figure 1.5: Sensing–Intuition[10] and work area



[9] χ^2=2,045.38; significant at p<0.001.
[10] χ^2=1,957.23; significant at p<0.001.

Figure 1.6: Thinking–Feeling[11] and work area

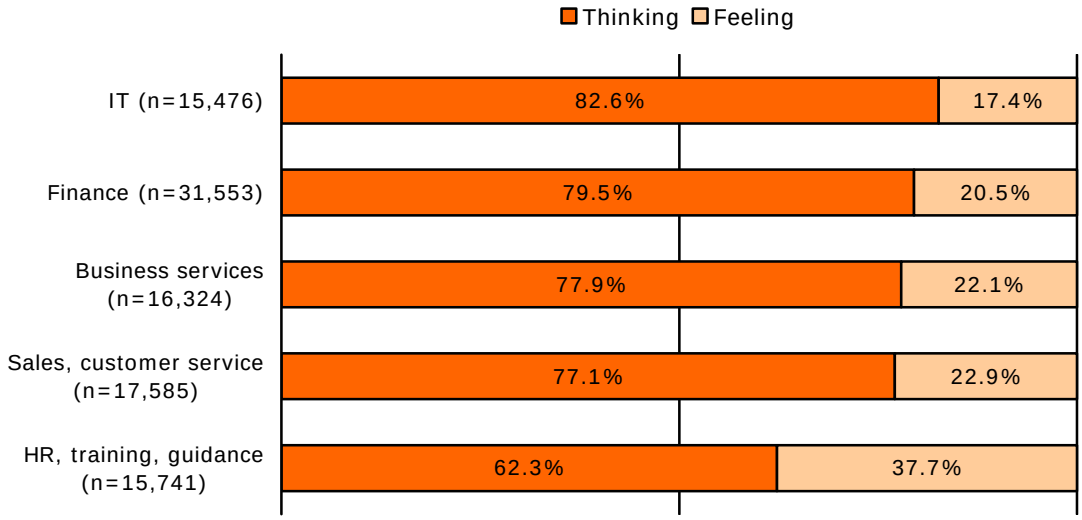
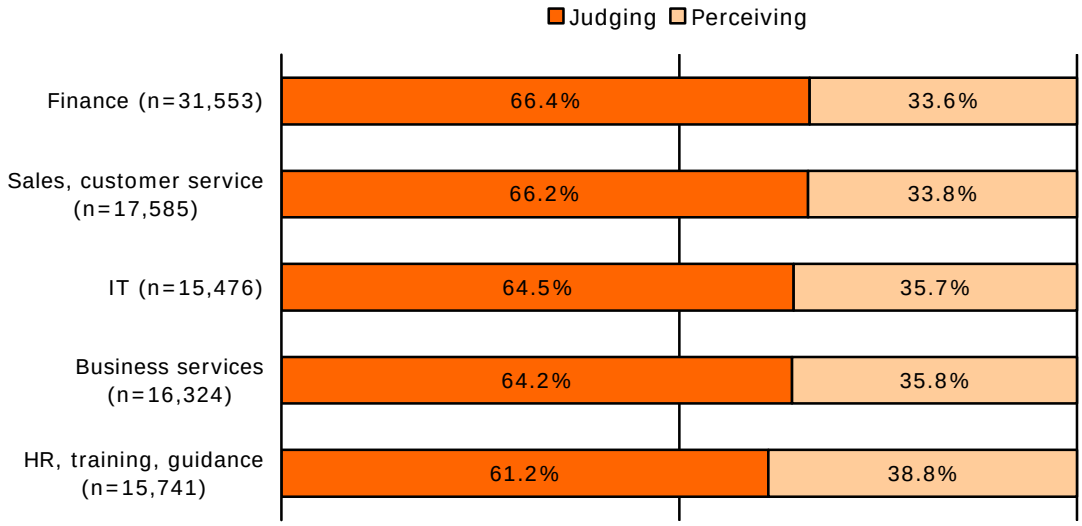


Figure 1.7: Judging–Perceiving[12] and work area



[11] χ^2=6,409.54; significant at p<0.001.
[12] χ^2=502.45; significant at p<0.001.

Employment status

Employment status information was available for the sample. The analyses showed statistically significant and meaningful differences across the groups on three dimensions: Sensing–Intuition, Thinking–Feeling and Judging–Perceiving. Amongst those in employment, self-employed people were considerably more likely to have a preference for Intuition[13], and slightly more likely to have a preference for Perceiving[14], than those who described themselves as working full-time or part-time. Those who worked full-time were more likely to have a preference for Thinking than those who were self-employed, who in turn were more likely to have a preference for Thinking than those who worked part-time.[15] The Thinking–Feeling pattern is likely to be a gender effect; 85% of part-time workers were female, compared with 40% of the total group and 37% of full-time workers.

[13] χ^2=458.73; significant at $p<0.001$.
[14] χ^2=206.17; significant at $p<0.001$.
[15] χ^2=2,206.05; significant at $p<0.001$.

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Contents

Introduction

Data from four different samples were analysed to produce the findings in this chapter. A brief description of each sample is given below. Further details of the samples are provided in Appendix 1.

- A group of 1,634 individuals, specifically sampled by the Office of National Statistics to be representative of the UK general population. The group completed a version of the MBTI® questionnaire in 1996 during the initial development of the European Step I questionnaire.
- A group of 167,824 individuals who completed the MBTI Step I questionnaire in European English via the OPPassessment system between March 2003 and mid-2008.[1] This sample is considered to be representative of the groups of people with whom the European English MBTI instrument has been and will be used for applications such as management development, coaching, counselling and teambuilding. As such, it is likely to represent a cross-section of the European English-speaking professional and managerial population.
- A group of 4,575 UK participants on management development programmes at Ashridge Business School, run between 2000 and 2003.[2]
- A sample of 695 individuals who completed the MBTI Step I questionnaire (or knew their MBTI reported type) and the 16PF®5 questionnaire as part of outplacement interviewing and counselling between September 1997 and June 2003.

The results of the analyses are outlined below.

[1] OPPassessment allows personality questionnaires such as the MBTI instrument to be administered via email and/or completed online.
[2] Data reproduced with kind permission from Ashridge Business School.

Type distribution

Type tables are a way of illustrating the proportion of each type within a particular group. Below are four type tables taken from the samples described above, namely the UK general population sample, the professional and managerial group taken from OPPassessment, the Ashridge management development programme participants, and the outplacement interviewing and counselling sample.

For each of the 16 different types, the number of cases, the percentage of the total that this represents and the self-selection ratio (SSR) are shown. The SSR (Myers et al., 1998) is a way of demonstrating whether a given type appears more or less often in a particular group than would be expected given its frequency in a reference group. The UK general population dataset is used as the reference group when calculating the SSRs in this chapter.

An SSR of greater than 1 indicates that a type is over-represented, and an SSR of less than 1 denotes that it is under-represented. Asterisks are used to denote whether the over- or under-representations are statistically significant, based on the results of chi-square analysis.[3]

[3] Chi-square analysis (often abbreviated to χ^2) is a technique used to explore whether observed frequency distributions differ significantly from other, predefined, distributions. In this case, the UK general population group is used as the reference group, and the chi-square analysis indicates whether the proportion of people of each type within a particular sample differs significantly from the proportion of people reporting the same type within the reference group.

UK general population sample[4]

Table 2.1: Type table for the UK general population sample[5] (reported type, n=1,634)

ISTJ	ISFJ	INFJ	INTJ
n=224 13.7%	n=208 12.7%	n=28 1.7%	n=23 1.4%
ISTP	**ISFP**	**INFP**	**INTP**
n=105 6.4%	n=100 6.1%	n=52 3.2%	n=40 2.4%
ESTP	**ESFP**	**ENFP**	**ENTP**
n=95 5.8%	n=142 8.7%	n=103 6.3%	n=45 2.8%
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=170 10.4%	n=206 12.6%	n=45 2.8%	n=48 2.9%

Type	n	%
E	854	52.6%
I	780	47.4%
S	1,250	76.5%
N	384	23.5%
T	750	45.9%
F	884	54.1%
J	952	58.3%
P	682	41.7%

The most common single type preference is ISTJ (14% of the total), closely followed by ISFJ (13%), ESFJ (13%) and ESTJ (10%). The least frequently occurring type is INTJ (1%), followed by INFJ and INTP (both 2%), and ENTP, ENFJ and ENTJ (all 3%).

This pattern is not dissimilar to that found in the USA (Hammer and Mitchell, 1996) and Sweden (*MBTI Step I Swedish Version Manual Supplement*, 2003), the only other countries for which data from nationally representative samples have been collected.

[4] Reproduced from *European English MBTI Step I Manual Supplement* (1998) with kind permission of CPP Inc.
[5] Note that no SSRs are shown in this table because the table contains the reference group itself. Reproduced from *European English MBTI Step I Manual Supplement* (1998) with kind permission of CPP Inc.

OPPassessment data (representative European English-speaking professionals and managers)

Table 2.2: Type table for OPPassessment data (reported type, n=167,824)

ISTJ	ISFJ	INFJ	INTJ
n=20,852 12.4% SSR=0.91	n=4,619 2.8% SSR=0.22**	n=2,410 1.4% SSR=0.84	n=9,582 5.7% SSR=4.06**
ISTP	**ISFP**	**INFP**	**INTP**
n=5,517 3.3% SSR=0.51**	n=1,353 0.8% SSR=0.13**	n=2,670 1.6% SSR=0.50**	n=8,291 4.9% SSR=2.02**
ESTP	**ESFP**	**ENFP**	**ENTP**
n=8,960 5.3% SSR=0.92	n=3,220 1.9% SSR=0.22**	n=8,498 5.1% SSR=0.80*	n=17,761 10.6% SSR=3.84**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=33,910 20.2% SSR=1.94**	n=9,913 5.9% SSR=0.47**	n=7,256 4.3% SSR=1.57**	n=23,012 13.7% SSR=4.67**

Type	n	%
E	112,530	67.1%**
I	55,294	32.9%**
S	88,344	52.6%*
N	79,480	47.4%*
T	127,885	76.2%**
F	39,939	23.8%**
J	111,554	66.5%*
P	56,270	33.5%*

*Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

The most common single type preference is ESTJ (20% of the total); this is a common finding with managerial groups in other countries. The SSR results suggest that, in comparison with the general population, those with preferences for NT are over-represented, and those with preferences for SF are under-represented. Again, this is a common finding with managerial groups in other countries.

Management development programme participants

Table 2.3: Type table for management development course participants (reported type, n=4,575)

ISTJ	ISFJ	INFJ	INTJ
n=661 14.4% SSR=1.05	n=77 1.7% SSR=0.13**	n=53 1.2% SSR=0.68	n=420 9.2% SSR=6.52**
ISTP	**ISFP**	**INFP**	**INTP**
n=184 4.0% SSR=0.63**	n=34 0.7% SSR=0.12**	n=73 1.6% SSR=0.50**	n=366 8.0% SSR=3.27**
ESTP	**ESFP**	**ENFP**	**ENTP**
n=214 4.7% SSR=0.80	n=51 1.1% SSR=0.13**	n=177 3.9% SSR=0.61**	n=560 12.2% SSR=4.44**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=817 17.9% SSR=1.72**	n=114 2.5% SSR=0.20**	n=102 2.2% SSR=0.81	n=672 14.7% SSR=5.00**

Type	n	%
E	2,707	59.2%**
I	1,868	40.8%**
S	2,152	47.0%**
N	2,423	53.0%**
T	3,894	85.1%**
F	681	14.9%**
J	2,916	63.7%**
P	1,659	36.3%**

*Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

The type distribution is similar to the OPPassessment sample described in Table 2.2, with ESTJ (18% of the total) being the most common single type preference, and NT being over-represented and SF being under-represented. The main difference between the two distributions is a higher proportion of people with a preference for Thinking amongst the management development group. This is likely to be at least partly a gender effect, as the above sample contains a higher proportion of males (77%) than does the OPPassessment group (59%).

Outplacement interviewing and counselling sample

Table 2.4: Type table for outplacement interviewing and counselling sample (n=695)

ISTJ	ISFJ	INFJ	INTJ
n=85 12.2% SSR=0.89	n=29 4.2% SSR=0.33**	n=9 1.3% SSR=0.76	n=54 7.8% SSR=5.52**
ISTP	**ISFP**	**INFP**	**INTP**
n=26 3.7% SSR=0.58*	n=9 1.3% SSR=0. 21**	n=23 3.3% SSR=1.04	n=41 5.9% SSR=2.41**
ESTP	**ESFP**	**ENFP**	**ENTP**
n=29 4.2% SSR=0.72	n=14 2.0% SSR=0.23**	n=39 5.6% SSR=0.89	n=79 11.4% SSR=4.13**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=104 15.0% SSR=1.44**	n=41 5.9% SSR=0.47**	n=29 4.2% SSR=0.81	n=84 12.1% SSR=4.11**

Type	n	%
E	419	60.3%**
I	276	39.7%**
S	337	48.5%**
N	358	51.5%**
T	502	72.2%**
F	193	27.8%**
J	435	62.6%
P	260	37.4%

*Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

The most common single type preference is ESTJ (15% of the total); this is a common finding with other managerial groups, as are the SSR results, which suggest that, in comparison with the UK general population, those with preferences for NT are over-represented and those with preferences for SF are under-represented.

Reliability

The reliability of a test or questionnaire relates to how consistent and precise it is. Internal consistency reliability addresses the question of whether all the questions in a scale measure the same construct. A common measure of internal consistency reliability is coefficient alpha (Cronbach, 1951). The alpha coefficients for the UK general population and OPPassessment samples are shown in Table 2.5.

Table 2.5: Internal consistency reliability – alpha coefficients

Dimension	Coefficient alpha	
	General population[6]	OPPassessment
E–I	0.84	0.85
S–N	0.80	0.82
T–F	0.81	0.81
J–P	0.82	0.83

Another method of looking at internal consistency involves calculating split-half reliability. Historically, the split-half reliabilities reported for the MBTI questionnaire were based on Myers' logical split-halves, in which she matched characteristics of items in each half. Following, as far as possible, Myers' own approach to a logical split of the items, split-half reliabilities have been calculated on the general population sample. These are shown in Table 2.6.

Table 2.6: Internal consistency reliability – split-half

Dimension	Split-half reliability
	General population[6]
E–I	0.82
S–N	0.81
T–F	0.84
J–P	0.84

It is generally agreed that internal consistency reliability should achieve a value of at least 0.7 for a test to be considered to be reliable.[7] On this basis, all the dimensions of the questionnaire show good internal consistency reliability in the general population and OPPassessment groups, and using both methods of calculation. In addition, the alpha coefficients have been found to be consistent across different age groups and across males and females.

Test–retest reliability is another form of reliability, and is concerned with the consistency of results on the same instrument over time. It is

[6] Reproduced from *European English MBTI Step I Manual Supplement* (1998) with kind permission of CPP Inc.
[7] For example, see Nunnally (1978) or Kline (2000).

calculated by correlating the results from the first time an instrument is taken with those of a subsequent administration after a suitable period of time has elapsed. The strength of these correlations is a measure of how consistent the instrument is over time. The test–retest correlations obtained with a one- to six-month interval between administrations are shown in Table 2.7, based on a sample of 81 individuals who knew their reported MBTI type. The table also shows the proportion of people who had the same preference on both testing occasions for each dimension, and the proportion of people for whom four, three and two preferences remained the same on both occasions. None of the participants had fewer than two of their preferences remaining the same. These figures are all very satisfactory as regards test–retest reliability.

Table 2.7: Test–retest reliability

Dimension	Correlation
E–I	0.92
S–N	0.93
T–F	0.89
J–P	0.91

Dimension	Percentage reporting the same preference
E–I	91%
S–N	95%
T–F	95%
J–P	93%

All four preferences remaining the same	79%	95%
Three preferences remaining the same	16%	
Two preferences remaining the same	5%	5%
Fewer than two preferences remaining the same	0%	

Intercorrelations between MBTI dimensions

One of the original aims of developing the MBTI questionnaire was to see if dimensions could be produced that were independent of each other.[8] Results from other language versions have shown that this was achieved with all dimensions except Sensing–Intuition and Judging–Perceiving. This shows up despite the fact that questions were carefully chosen to sort on only one dimension. The author of the questionnaire hypothesised that the S–N/J–P relationship may simply be a reflection of reality rather than a failing in the construction of the questionnaire.[8]

The intercorrelations between dimensions amongst the general population and OPPassessment samples are shown in Table 2.8. In order to be able to calculate the correlations, scores on each dimension were converted to continuous scores.[9]

Table 2.8: Intercorrelations between dimensions

	General population[8]			
	E–I	S–N	T–F	J–P
E–I		–0.18**	–0.13**	–0.13**
S–N			0.08**	0.40**
T-F				0.08**
J-P				

	OPPassessment			
	E–I	S–N	T–F	J–P
E-I		–0.13**	–0.15**	–0.05**
S-N			0.10**	0.41**
T-F				0.11**
J-P				

**All correlations statistically significant at $p<0.01$.

Although statistically significant, only very low correlations were found between most of the dimensions. The S–N/J–P relationship that has been found with other language versions has been replicated, showing that a preference for Sensing is likely to be associated with a preference for Judging, and that a preference for Intuition is likely to be associated with a preference for Perceiving. There was a high degree of consistency found in the correlations across the two samples.

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[9] Continuous scores (Myers and McCaulley, 1985, p. 9) place an individual's score on each dimension onto a continuous scale with a mid-point of 100. To calculate continuous scores, Preference Clarity Index (PCI) scores for each dimension are either subtracted or added to 100, depending on which direction the overall preference is. PCI scores in the direction of E, S, T or J are subtracted from 100. PCI scores in the direction of I, N, F or P are added to 100.

Best-fit validity: the accuracy of the European English MBTI Step I instrument in predicting best-fit type

The purpose of the MBTI instrument is to help individuals to establish their validated or 'best-fit' psychological type. A key measure of the validity of the instrument is, therefore, how well the results relate to best-fit (validated) type. These data are useful to practitioners in knowing how typically accurate the reported result is likely to be.

Best-fit data are available for a group of 386 individuals who took part in a best-fit study during the development of the European Step I questionnaire. These individuals were all confident of their MBTI type preferences, and were trained and experienced users of the MBTI questionnaire.[10]

Table 2.9 presents the results of the analysis comparing reported with best-fit type. The European English MBTI Step I questionnaire performs in a very similar way to other European language versions, such as Danish, Dutch, French, German, Polish and Swedish, and there is very good evidence for the accuracy of the instrument. In nearly 72% of cases, a respondent's reported type will match their best-fit type, and in 93% of cases at least three of the four preferences will match.

Table 2.9: Match of reported and best-fit type[10]

	Best-fit study participants (n=386)	
Agrees with all four letters	71.5%	93.0%
Agrees with three letters	21.5%	
Agrees with two letters	6.1%	7.0%
Agrees with one letter	0.3%	
Agrees with no letters	0.3%	

Dimension	Percentage agreement
	Best-fit study participants (n=386)
E–I	92.1%
S–N	93.8%
T–F	88.4%
J–P	89.0%

It is well recognised by users of the questionnaire that environmental pressures can affect individuals' responses to the items on the questionnaire. For instance, an individual may feel that their work environment pressures them to behave in a Judging way when their

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true preference is for Perceiving. Pressures such as these mean that an individual's best-fit type may be masked in the type reported through the questionnaire.

Individuals who took part in the best-fit study were asked (a) whether they felt any pressures to report one type over another and (b) if so, where they felt the roots of those pressures to be. There was a clear pattern on individuals feeling pressures to be E, S, T and J (in line with Myers' own hypothesis). Work and the organisational culture appear to be the main sources of these pressures. These data support the continued use of the tie-breaking formula, ie breaking tied scores in the direction of I, N, F and P (countering these pressures).

Figures 2.1–2.4 show, for the best-fit study, in which direction the pressures were felt to be.[11]

Figure 2.1: Percentage aware of pressures on themselves to be E or I

Figure 2.2: Percentage aware of pressures on themselves to be S or N

Figure 2.3: Percentage aware of pressures on themselves to be T or F

Figure 2.4: Percentage aware of pressures on themselves to be J or P

[11] Text above and Figures 2.1–2.8 reproduced from *European English MBTI Step I Manual Supplement* (1998) with kind permission of CPP Inc.

Figures 2.5–2.8 indicate where individuals felt those pressures had come from. To interpret the charts, please refer to the following key:

Nature of the work
Organisational norms
Family of origin
Current family
Other

Figure 2.5: Nature of pressures to be E or I

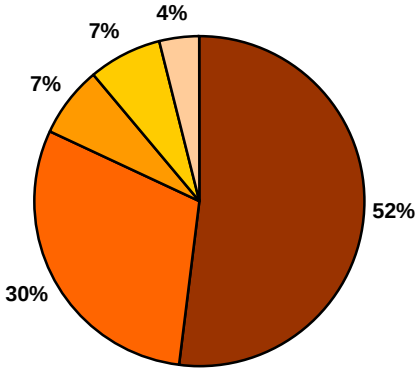


Figure 2.6: Nature of pressures to be S or N

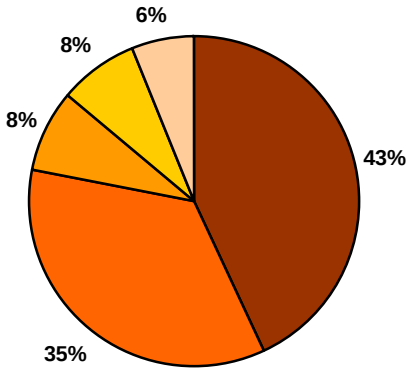


Figure 2.7: Nature of pressures to be T or F

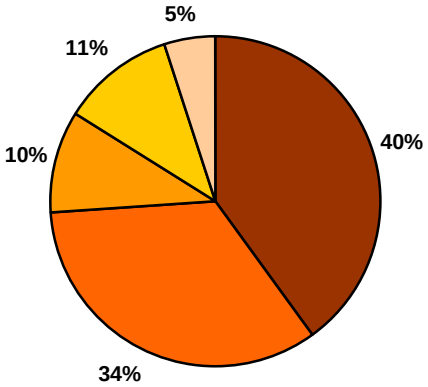
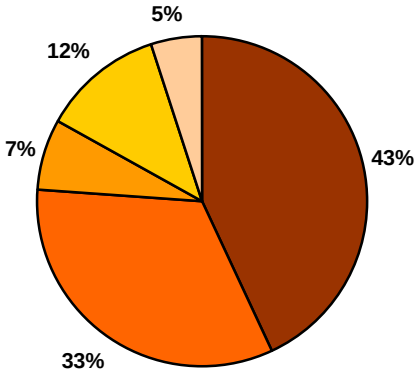


Figure 2.8: Nature of pressures to be J or P



Construct validity

Construct validity is concerned with whether an instrument successfully measures a particular psychological construct. If it can be demonstrated that an instrument does do this, then the instrument can be said to have construct validity.

Construct validity can be measured in two ways. The first method is to correlate individuals' scores on the instrument with the behaviours they would be expected to show if they possessed the relevant psychological construct. The second method is to correlate scores on the instrument with those on another instrument which is already in existence and for which we already know what the scores measure.

In accordance with the first method, the UK general population sample were asked to respond to a number of questions about their views on work and organisational issues, as well as to complete the MBTI Step I questionnaire.

Comfort with different organisational cultures[12]

The respondents were initially asked to record on a five-point scale their degree of comfort with different types of organisations, where 1 represented 'Very comfortable' and 5 'Very uncomfortable'. Prior to analysing the data, MBTI experts made predictions about the relationships between the MBTI dimensions and the responses to the questions. Once the predictions had been made, the data were analysed to explore the relationships between reported MBTI preferences and comfort with different organisational cultures. The questions, predictions and results are shown in Table 2.10. Asterisks in the significance column indicate significant relationships, based on the results of one-way analysis of variance. Where there are no asterisks, this signifies that the data did not support the prediction.

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Table 2.10: Comfort expressed by different types with different organisational cultures[13]

Organisational characteristic	Prediction		Sig.
	More comfort	Less comfort	
An organisation which has clear structures so that it is always clear who is responsible for what	S	N	***
	J	P	***
	SJ	Non-SJ	***
An organisation which emphasises the independence of individual employees	N	S	*
	NT	Non-NT	**
An organisation which emphasises employee loyalty and offers a 'job for life'	SJ	Non-SJ	***
	ISJ	Non-ISJ	**
An organisation where everything is done 'by the book'	SJ	Non-SJ	***
	STJ	Non-STJ	***
An organisation employing thousands of people, possibly working in more than one country	E	I	***
	EN	Non-EN	
An organisation where jobs of individual workers are made as simple as possible	S	N	***
	Non-NT	NT	***
An organisation with people from many different backgrounds	NF	Non-NF	**
	NFP	Non-NFP	***
An organisation where individual people may have responsibility for many different areas	EN	Non-EN	*
An organisation where everyone is expected to 'toe the line'	SJ	Non-SJ	***
	ISJ	Non-ISJ	***
An organisation where jobs are relatively insecure but there are many opportunities for advancement and high pay	EP	Non-EP	**
	ETP	Non-ETP	**
An organisation where you are never expected to work late or in your own time	S	N	***
	J	P	
	SJ	Non-SJ	***
An organisation with fewer than 30 employees where everyone knows everyone	F	T	***
	SF	Non-SF	***
An organisation which views its employees as individuals with particular skills	F	T	
	IF	Non-IF	
An organisation where most people come from the same background	S	N	***
	SJ	Non-SJ	***
	ISJ	Non-ISJ	***

Significant at: *p<0.05, **p<0.01, ***p<0.001.

Most of the predicted relationships were found to be supported by the data, with the majority being statistically significant at the highest level. Of the four non-significant relationships, perhaps the most surprising was that between Feeling and comfort with a culture where people were viewed as individuals with particular skills.

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Comfort with different types of job[14]

Respondents were asked to record on a five-point scale their degree of comfort in working in different kinds of jobs, where 1 represented 'Very comfortable' and 5 'Very uncomfortable'. Predictions about the relationships between the MBTI dimensions and the responses to the questions were made in the same way as in the section above. The results are presented in Table 2.11.

Table 2.11: Comfort expressed by different types with different kinds of jobs[14]

Job characteristic	Prediction		Sig.
	More comfort	Less comfort	
A job which involves you in a series of distinct projects	J	P	*
	SJ	Non-SJ	
A job with a lot of variety, some of it unexpected	P	J	***
	EP	Non-EP	***
	ENP	Non-ENP	***
A job where you would expect to report to the same manager from day to day	SJ	Non-SJ	***
	ISJ	Non-ISJ	*
	ISFJ	Non-ISFJ	*
A job in which more or less the same things happen every day	SJ	Non-SJ	***
	ISJ	Non-ISJ	***
A job which places lots of demands on you, sometimes requiring you to work long hours to reach deadlines or achieve goals	NT	Non-NT	***
	NTJ	Non-NTJ	***
A job where you would report to a number of different people depending on the task at hand	NP	Non-NP	**
	ENP	Non-ENP	***

Significant at: *p<0.05, **p<0.01, ***p<0.001.

Again, most of the relationships predicted by the theory were found to hold good in respect of reported type. For example, it is unsurprising to find that dominant extraverted Intuitives expressed greater comfort with variety and unpredictability in their working lives than did other types. The sole prediction unsupported by the data was that of SJs preferring a series of distinct work projects, which was based on the theory suggesting that SJs prefer structure and stability over the variety and unpredictability preferred by ENPs. This theme is explored further in the next set of results.

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Job characteristics and whole type[15]

In order to establish patterns of reported comfort with specific job characteristics at whole-type level, the types are ranked in Table 2.12 according to those who expressed most and least comfort respectively.

Table 2.12: Whole types reporting most and least comfort with various job characteristics[15]

Job characteristic	Most comfort	Least comfort
A job which involves you in a series of distinct projects	1. ESTJ 2. ENTJ 3. ENFJ 4. INFP	1. INTP 2. ISTP 3. ENTP 4. ESTP
A job with a lot of variety, some of it unexpected	1. ESFP 2. INFP 3. ESTP 4. ISFP	1. INFJ 2. ISFJ 3. ISTJ 4. INTP
A job where you would expect to report to the same manager from day to day	1. ESFJ 2. ISTJ 3. ESFP 4. ISFJ	1. INFP 2. ENTJ 3. INTP 4. ENFP
A job in which more or less the same things happen every day	1. ISFJ 2. ESFJ 3. ISTP 4. ESTJ	1. ENTP 2. ENTJ 3. INFP 4. INTP
A job which places lots of demands on you, sometimes requiring you to work long hours to reach deadlines or achieve goals	1. ENTJ 2. ENTP 3. ENFP 4. INTJ	1. INFJ 2. ISFP 3. ISTP 4. ISFJ
A job where you would report to a number of different people depending on the task at hand	1. ESFP 2. INFP 3. ESTP 4. ISFP	1. INFJ 2. ISFJ 3. ISTJ 4. INTP

There are some interesting patterns that emerge from these data, some of which are discussed below.

For those questions that relate to consistency ('a job where you would expect to report to the same manager from day to day', and where

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‘more or less the same things happen every day’) the top four types are all Sensing types and mostly SJ types who would be predicted to prefer specificity, clarity and consistency. The four types reporting least comfort in these areas are all N types and mostly NP types, the opposite of SJ.

‘A job with lots of variety, some of it unexpected’ seems to be particularly attractive to Perceiving types, particularly SFPs. Myers called SPs adaptable realists and described them as ‘seeking new experiences in the present moment[…]They adapt to situations as they arise.’ Those least comfortable with a lot of variety are Introverts and mostly IJ types who like quiet for concentration (I) and an ordered and planned approach (J). In combination, these characteristics are likely to lead to a dislike of the unexpected and a preference for concentrating on one thing at a time.

‘A job which places lots of demands on you, sometimes requiring you to work long hours to reach deadlines or achieve goals’ is perceived as most comfortable for Intuitive and mostly ENT types. It is seen as least comfortable by the four IF types. Myers described the action-oriented Thinking types (ETs) as “active and energetic. They like to make things happen…” and this relates well to the question above. The reflective harmonisers (IFs) are “quiet and caring. They have concern for deep and enduring values, as well as for people” (Myers and McCaulley, 1985) and may see a highly demanding job as detracting from other important aspects of their lives and people they value.

‘A job where you would report to a number of different people depending on the task at hand’ is most comfortable for Perceiving types, particularly FP and SP types. FPs are ‘… adaptable, affiliative harmony seekers who are concerned with the human aspects of problems.’ SPs, as described above, seek new experiences and adapt to situations as they arise. Together, these descriptions reflect closely the approach of those who might be comfortable reporting to different people.

Finally, ‘a job that involves you in a number of distinct projects’ is perceived as least comfortable to the four TP types. These types introvert their Thinking and often work privately to analyse and understand the world. It is not clear why this type combination reports particular discomfort with this kind of work, although they may resist having others structure their work or dictate the boundaries between one project and the next.

Correlations with other instruments

Correlations between the MBTI Step I questionnaire and other psychometric instruments provide another way of establishing construct validity.

Correlations of MBTI continuous scores with the FIRO-B® instrument[16]

The FIRO-B instrument explores individuals' expressed and wanted behaviours in three areas of interpersonal need: Inclusion, Control and Affection.

FIRO-B Inclusion relates to the level of personal interaction, sociability and contact initiated by an individual (Expressed Inclusion) and the degree to which an individual wants to be given a sense of belonging and inclusion (Wanted Inclusion).

It was predicted that Extraversion would relate to Wanted Inclusion, but particularly strongly to Expressed Inclusion.

FIRO-B Control relates to the degree to which individuals like to take on responsibility, make decisions and assume leadership of others (Expressed Control) and the degree to which they want or will tolerate control from others (Wanted Control).

It was predicted that relationships would be found between Expressed Control and Thinking.

FIRO-B Affection reflects the level of warmth and friendliness an individual shows to others (Expressed Affection) and the amount of warmth they want to receive from others (Wanted Affection).

Extraversion and, in particular, Feeling should relate to both these scales.

The UK general population sample completed the FIRO-B questionnaire alongside the MBTI questionnaire. The correlations between the two instruments are shown in Table 2.13.

Table 2.13: Correlations of MBTI Step I continuous scores with FIRO-B scales (n=1,512)[16]

	E–I	S–N	T–F	J–P
Expressed Inclusion	–0.41***	0.12**	0.10***	0.02
Wanted Inclusion	–0.38***	0.19**	0.10***	0.07**
Expressed Control	–0.13***	0.18**	–0.24***	0.00
Wanted Control	0.07**	0.02	0.18***	–0.02
Expressed Affection	–0.36***	0.10**	0.25***	0.00
Wanted Affection	–0.27***	0.03	0.23***	0.00

Significant at: **p<0.01, ***p<0.001.

All the predictions were supported by the data. Note that positive correlations indicate relationships with I, N, F or P and negative correlations indicate relationships with E, S, T or J.

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Correlations of MBTI continuous scores with an Adjective Check List[17]

The UK general population sample completed a 164-item Adjective Check List (ACL). Each person was asked to indicate whether each of the adjectives reflected them or not. Predictions were made about which words would be endorsed by which types. The detailed predictions are shown in Appendix 2, together with correlations between each of the ACL words and the MBTI Step I continuous scores. Table 2.14 summarises the data by showing which of the adjectives were the strongest correlates of the MBTI dimensions.

Table 2.14: Strongest correlates of MBTI dimensions with ACL items[18]

Correlates of Extraversion stronger than –0.20							
Talkative:	–0.56	Outgoing:	–0.50	Sociable:	–0.39	Spontaneous:	–0.32
Confident:	–0.31	Adventurous:	–0.30	Pleasure-seeking:	–0.28	Enthusiastic:	–0.27
Witty:	–0.26	Assertive:	–0.25	Outspoken:	–0.25	Energetic:	–0.24
Sharp-witted:	–0.24	Ambitious:	–0.23	Headstrong:	–0.23	Has wide interests:	–0.22
Active:	–0.21						
Correlates of Introversion exceeding 0.20							
Quiet:	0.49	Reserved:	0.44	Shy:	0.43	Withdrawn:	0.36
Retiring:	0.34	Timid:	0.31	Gloomy:	0.24	Inhibited:	0.24
Unambitious:	0.22	Meek:	0.22	Serious:	0.20	Cold:	0.20
Correlates of Sensing greater than –0.20							
Traditional:	–0.36	Conventional:	–0.34	Conscientious:	–0.26	Conforming:	–0.26
Conservative:	–0.24	Steady:	–0.21				
Correlates of Intuition exceeding 0.20							
Unconventional:	0.31	Imaginative:	0.27	Rebellious:	0.26	Adventurous:	0.24
Artistic:	0.23	Individualistic:	0.23	Creative:	0.22	Has wide interests:	0.22
Insightful:	0.21						
Correlates of Thinking greater than –0.20							
Hard:	–0.28	Unemotional:	–0.23	Fault finding:	–0.22	Cold:	–0.21
Ruthless:	–0.20	Aggressive:	–0.20				
Correlates of Judging greater than –0.20							
Plans things carefully:	–0.39	Organised:	–0.38	Methodical:	–0.29	Traditional:	–0.27
Precise:	–0.26	Thorough:	–0.25	Conservative:	–0.23		
Correlates of Perceiving exceeding 0.20							
Rebellious:	0.28	Reckless:	0.23	Impulsive:	0.22	Adventurous:	0.21

[17] Reproduced from *European English MBTI Step I Manual Supplement* (1998) with kind permission of CPP Inc.

[18] When interpreting the content of this table, please note that the adjectives listed for each preference are those that correlated strongest with that preference, in a positive direction. The negative values for the correlations with E, S, T and J are a reflection of the fact that continuous scores were used in the calculations. Reproduced from *European English MBTI Step I Manual Supplement* (1998) with kind permission of CPP Inc.

Of the correlates shown in the table, only two' were not predicted beforehand: Extraversion – 'sharp-witted', and Intuition – 'adventurous'. The most highly endorsed adjectives make a great deal of sense from a type perspective.

For some type preferences (notably Introversion and Thinking), many of the strongest correlates are negative in tone. Remember these data relate to how individuals see themselves rather than how others see them. Also, it is possible that Introverted types and Thinking types, being different from the UK cultural norms, may view some of their own characteristics in a harsh light. These data are comparable with US data reported in the *MBTI Manual* (Myers and McCaully, 1985) in table 11.12 (pp. 212–14).

Finally, the ACL data were analysed by whole type to see which adjectives were most often endorsed. Table 2.15 shows the 15 most highly endorsed adjectives for each type. Adjectives not in bold appear in ten or more of the different type lists, so those in bold are the ones that are more distinctive to that type. The numbers at the bottom of each cell show how many frequently endorsed adjectives were selected by each type. Focusing particularly on the adjectives that are in bold is a quick way to appreciate the 'unique' ways each of the 16 types describe themselves.

Table 2.15: Adjectives most often endorsed by each of the 16 MBTI types.[19]

ISTJ	ISFJ	INFJ	INTJ
Reliable	Kind	Appreciative	Appreciative
Kind	Reliable	**Cautious**	**Bright**
Reasonable	Thoughtful	Considerate	Considerate
Fair-minded	Reasonable	**Creative**	**Determined**
Mature	Considerate	**Curious**	**Gentle**
Steady	**Sympathetic**	Dependable	**Logical**
Thoughtful	Cooperative	Down-to-earth	**Persistent**
Considerate	**Gentle**	Fair-minded	Reasonable
Cooperative	**Steady**	**Gentle**	**Stable**
Stable	Fair-minded	Kind	**Steady**
Dependable	**Mature**	**Peaceable**	**Thorough**
Down-to-earth	Understanding	**Steady**	Cooperative
Conscientious	**Conscientious**	Understanding	Thoughtful
Appreciative	**Sensitive**	**Bright**	Dependable
Understanding	Appreciative	**Conscientious**	**Alert**
(11)	(9)	(7)	(6)
ISTP	**ISFP**	**INFP**	**INTP**
Fair-minded	Kind	Kind	Fair-minded
Kind	Fair-minded	**Bright**	Kind
Cooperative	Reasonable	Fair-minded	**Bright**
Reasonable	Considerate	Appreciative	**Intelligent**
Down-to-earth	**Steady**	**Forgiving**	Reliable
Reliable	Understanding	**Gentle**	Dependable
Steady	**Easy-going**	Reliable	Reasonable
Considerate	Down-to-earth	**Sensitive**	Appreciative
Dependable	Cooperative	Thoughtful	**Individualistic**
Independent	Dependable	Cooperative	**Logical**
Thoughtful	Thoughtful	**Easy-going**	**Stable**
Curious	**Gentle**	Reasonable	Understanding
Stable	Reliable	**Sympathetic**	**Complex**
Understanding	**Sympathetic**	Understanding	Cooperative
Easy-going	Appreciative	**Curious**	**Curious**
(10)	(11)	(8)	(8)
ESTP	**ESFP**	**ENFP**	**ENTP**
Kind	Down-to-earth	Considerate	**Talkative**
Considerate	Kind	Cooperative	**Curious**
Easy-going	Reasonable	Kind	Fair-minded
Cooperative	Understanding	Reasonable	Thoughtful
Down-to-earth	Considerate	Appreciative	Considerate
Enthusiastic	Reliable	Fair-minded	**Enthusiastic**
Reliable	**Sympathetic**	**Sensitive**	**Intelligent**
Shows initiative	**Easy-going**	**Sympathetic**	Reasonable
Thoughtful	Fair-minded	Thoughtful	**Self-sufficient**
Dependable	**Sensitive**	**Imaginative**	**Bright**
Sociable	**Sociable**	Reliable	**Determined**
Determined	Thoughtful	**Sociable**	**Outgoing**
Reasonable	**Forgiving**	Understanding	**Sociable**
Fair-minded	**Enthusiastic**	Dependable	Cooperative
Alert	Appreciative	Down-to-earth	Reliable
(9)	(9)	(11)	(6)
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
Reliable	Reliable	**Conscientious**	**Conscientious**
Reasonable	Kind	Down-to-earth	**Intelligent**
Cooperative	Reasonable	**Enthusiastic**	Kind
Considerate	Considerate	**Intelligent**	Reliable
Kind	Understanding	**Outgoing**	**Bright**
Dependable	Appreciative	Reasonable	Fair-minded
Fair-minded	Cooperative	**Sympathetic**	Thoughtful
Down-to-earth	**Sympathetic**	Thoughtful	**Independent**
Steady	Thoughtful	Reliable	**Active**
Intelligent	**Sociable**	**Sensitive**	**Logical**
Sociable	**Easy-going**	Understanding	**Shows initiative**
Thoughtful	Down-to-earth	Appreciative	**Curious**
Appreciative	**Steady**	**Bright**	Dependable
Practical	Fair-minded	Cooperative	Down-to-earth
Stable	Dependable	**Curious**	**Enthusiastic**
(10)	(11)	(7)	(6)

[19] Reproduced from *European English MBTI Step I Manual Supplement* (1998) with kind permission of CPP Inc.

Several adjectives appear on the top 15 list of ten or more types. These are shown below (with the number of types for which each ranks in the top 15 in parentheses):

- Fair-minded (14)
- Thoughtful (14)
- Reasonable (14)
- Reliable (14)
- Cooperative (13)
- Kind (13)
- Considerate (12)
- Appreciative (12)
- Dependable (11)
- Down-to-earth (11)
- Understanding (11).

These words are highly socially desirable self-descriptors in the UK, and it is interesting to speculate whether they reflect some part of UK cultural values.

Relationship between the MBTI Step I instrument and the 16PF5 questionnaire

A group of almost 700 people completed the 16PF (5th edition) questionnaire and the MBTI Step I questionnaire as part of outplacement interviewing and counselling between 1997 and 2003. This allowed an exploration of the relationship between 16PF scores and MBTI type dichotomies in a large UK sample, and an exploration of the relationship between the 16PF instrument and whole type. Further details of the personality traits measured by the 16PF instrument are given in Appendix 3.

Extraversion–Introversion

Table 2.16 shows the mean sten[20] score for Extraverts and for Introverts on each of the 16PF scales, the difference between the means and the statistical significance of this difference (based on an independent-samples t-test).

[20] Sten scores are standardised scores which are computed from raw scores by comparing the raw scores against a norm table. Stens are based on a 10-point scale with a mean of 5.5 and a standard deviation of 2. Scores that fall further from the mean (in either direction) are considered more extreme. The more extreme a score is in a particular direction (or pole), the more likely that the descriptors for the scale's pole will apply for that score and that the trait will be apparent in the individual's behaviour.

Table 2.16: 16PF differences between Extraverts and Introverts

16PF Factor	Mean sten score		Sten difference [21]	Sig. (t-test)
	Extraverts	Introverts		
A (Warmth)	6.25	4.67	1.58	***
B (Reasoning)	7.79	8.18	–0.39	*
C (Emotional Stability)	6.47	5.70	0.77	***
E (Dominance)	6.89	5.68	1.20	***
F (Liveliness)	6.40	4.57	1.84	***
G (Rule-Consciousness)	4.58	5.24	–0.66	***
H (Social Boldness)	6.66	4.42	2.24	***
I (Sensitivity)	5.14	5.04	0.10	
L (Vigilance)	3.49	4.14	–0.65	**
M (Abstractness)	4.83	4.89	–0.06	
N (Privateness)	3.43	5.49	–2.06	***
O (Apprehension)	4.63	5.31	–0.68	***
Q1 (Openness to Change)	7.38	6.48	0.90	***
Q2 (Self-Reliance)	3.79	5.40	–1.61	***
Q3 (Perfectionism)	4.72	5.04	–0.32	
Q4 (Tension)	5.03	5.30	–0.27	
IM (Impression Management)	5.60	5.53	0.07	
Global Extraversion	7.38	4.79	2.58	***
Global Anxiety	4.03	4.87	–0.83	***
Global Tough-Mindedness	4.91	5.66	–0.75	***
Global Independence	6.85	5.34	1.51	***
Global Self-Control	4.80	5.61	–0.81	***

Difference significant at: *p<0.05, **p<0.01, ***p<0.001.

In part because of the large sample size, most scales show a statistically significant difference between Extraverts and Introverts. Some of these differences are in practice, however, quite small, and for practical purposes it is useful to take a difference of one sten as a meaningful criterion.

On this basis, Extraverts tend to be more:

- Socially bold (H)
- Lively (F)
- Warm (A)
- Dominant (E)
- and higher on Global Extraversion and Global Independence.

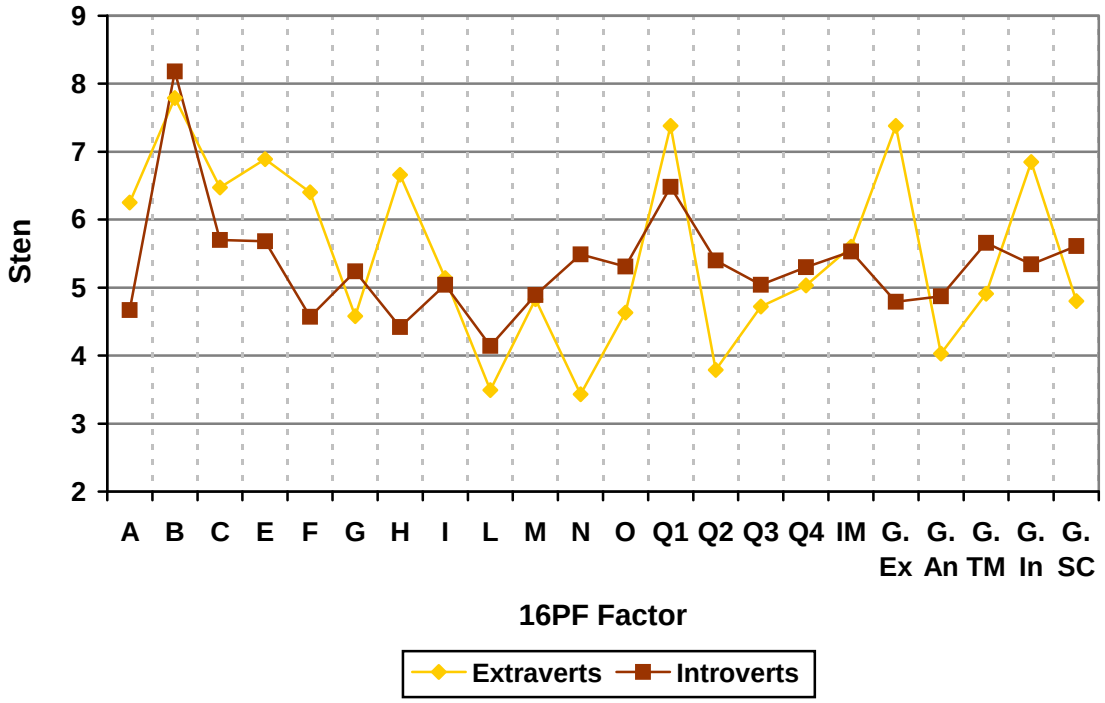
[21] Sten score difference between Extraverts and Introverts. Negative values indicate a higher score for Introverts.

Introverts tend to be more:

- Private (N)
- Self-reliant (Q2).

These differences are illustrated graphically in Figure 2.9.

Figure 2.9: Mean sten scores of Extraverts and Introverts on the 16PF scales[22]



[22] See Table 2.16 for abbreviations of factor names. G., global; Ex, Extraversion; An, Anxiety; TM, Tough-Mindedness; In, Introversion; SC, Self-Control.

Sensing–Intuition

Table 2.17 shows the mean sten score for Sensing types and for Intuitive types on each of the 16PF scales, the difference between the means and the statistical significance of this difference (based on an independent-samples t-test).

Table 2.17: 16PF differences between Sensing and Intuition types

16PF Factor	Mean sten score		Sten difference [23]	Sig. (t-test)
	Sensing	Intuition		
A (Warmth)	5.53	5.71	–0.18	
B (Reasoning)	7.79	8.14	–0.35	**
C (Emotional Stability)	6.20	6.13	0.06	
E (Dominance)	6.18	6.62	–0.44	*
F (Liveliness)	5.40	5.93	–0.53	**
G (Rule-Consciousness)	5.26	4.46	0.80	***
H (Social Boldness)	5.53	6.00	–0.47	***
I (Sensitivity)	4.75	5.42	–0.66	***
L (Vigilance)	3.89	3.62	0.27	
M (Abstractness)	4.01	5.65	–1.64	***
N (Privateness)	4.28	4.22	0.07	
O (Apprehension)	4.99	4.81	0.18	
Q1 (Openness to Change)	6.17	7.81	–1.65	***
Q2 (Self-Reliance)	4.51	4.36	0.15	
Q3 (Perfectionism)	5.38	4.36	1.03	***
Q4 (Tension)	5.27	5.01	0.26	
IM (Impression Management)	5.60	5.55	0.05	
Global Extraversion	6.14	6.54	–0.40	**
Global Anxiety	4.49	4.25	0.24	
Global Tough-mindedness	6.07	4.42	1.66	***
Global Independence	5.81	6.65	–0.84	***
Global Self-control	5.83	4.48	1.35	***

Difference significant at: *p<0.05, **p<0.01, ***p<0.001.

Looking at those scales which show a difference of at least one sten, those with a preference for Sensing tend to be higher on:

- Perfectionism (Q3)
- Global Tough-Mindedness
- Global Self-Control.

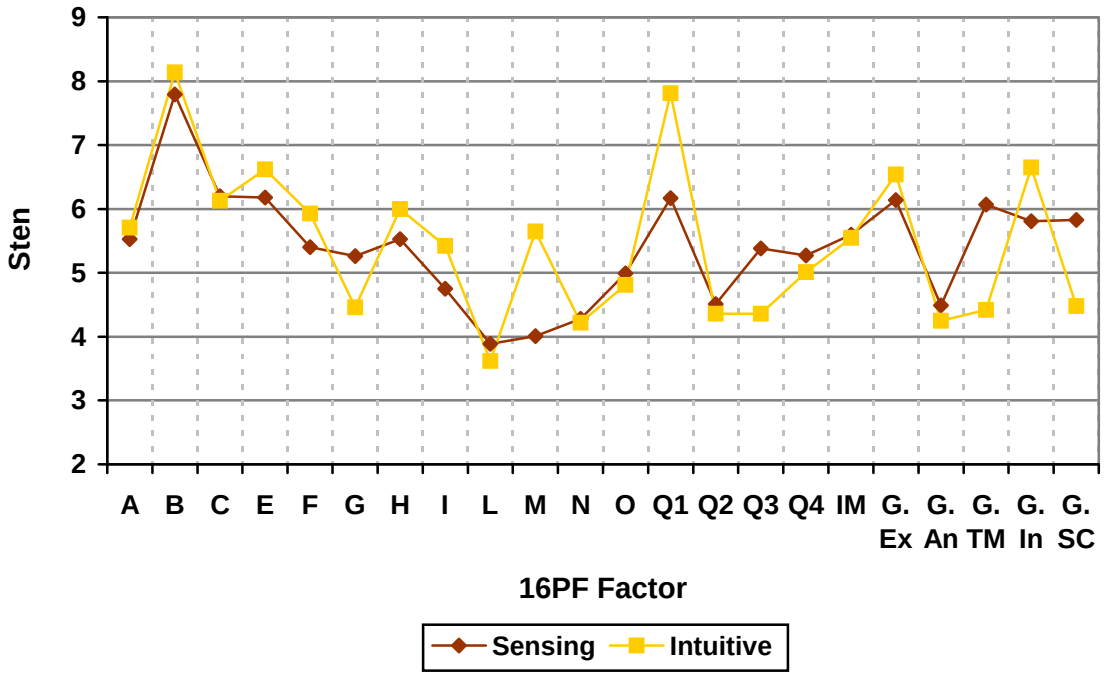
[23] Sten score difference between Sensing and Intuition. Negative values indicate a higher score for Intuitives.

Those with a preference for Intuition tend to be higher on:

- Openness to Change (Q1)
- Abstractness (M).

These differences are illustrated graphically in Figure 2.10.

Figure 2.10: Mean sten scores of Sensing and Intuitive types on the 16PF scales (see Table 21.6 and footnote to Figure 2.9 for abbreviations)



Thinking–Feeling

Table 2.18 shows the mean sten score for Thinking and for Feeling types on each of the 16PF scales, the difference between the means and the statistical significance of this difference (based on an independent-samples t-test).

Table 2.18: 16PF differences between Thinking and Feeling

16PF Factor	Mean sten score		Sten difference [24]	Sig. (t-test)
	Thinking	Feeling		
A (Warmth)	5.25	6.80	–1.55	***
B (Reasoning)	8.05	7.66	0.39	
C (Emotional Stability)	6.38	5.48	0.90	***
E (Dominance)	6.59	5.83	0.77	***
F (Liveliness)	5.56	6.05	–0.50	*
G (Rule-Consciousness)	4.89	4.68	0.21	
H (Social Boldness)	5.78	5.75	0.02	
I (Sensitivity)	4.71	6.31	–1.59	***
L (Vigilance)	3.84	3.47	0.37	*
M (Abstractness)	4.71	5.32	–0.61	***
N (Privateness)	4.38	3.83	0.56	**
O (Apprehension)	4.58	5.90	–1.31	***
Q1 (Openness to Change)	7.03	6.99	0.04	
Q2 (Self-Reliance)	4.52	4.16	0.36	
Q3 (Perfectionism)	4.91	4.68	0.23	
Q4 (Tension)	5.07	5.35	–0.28	
IM (Impression Management)	5.64	5.38	0.27	
Global Extraversion	6.13	7.03	–0.90	***
Global Anxiety	4.16	5.01	–0.85	***
Global Tough-Mindedness	5.52	4.23	1.28	***
Global Independence	6.39	5.81	0.58	***
Global Self-Control	5.22	4.81	0.41	**

Difference significant at: *p<0.05, **p<0.01, ***p<0.001.

Looking at those scales which show a difference of at least one sten, Thinking types tend to be higher on:

- Global Tough-Mindedness.

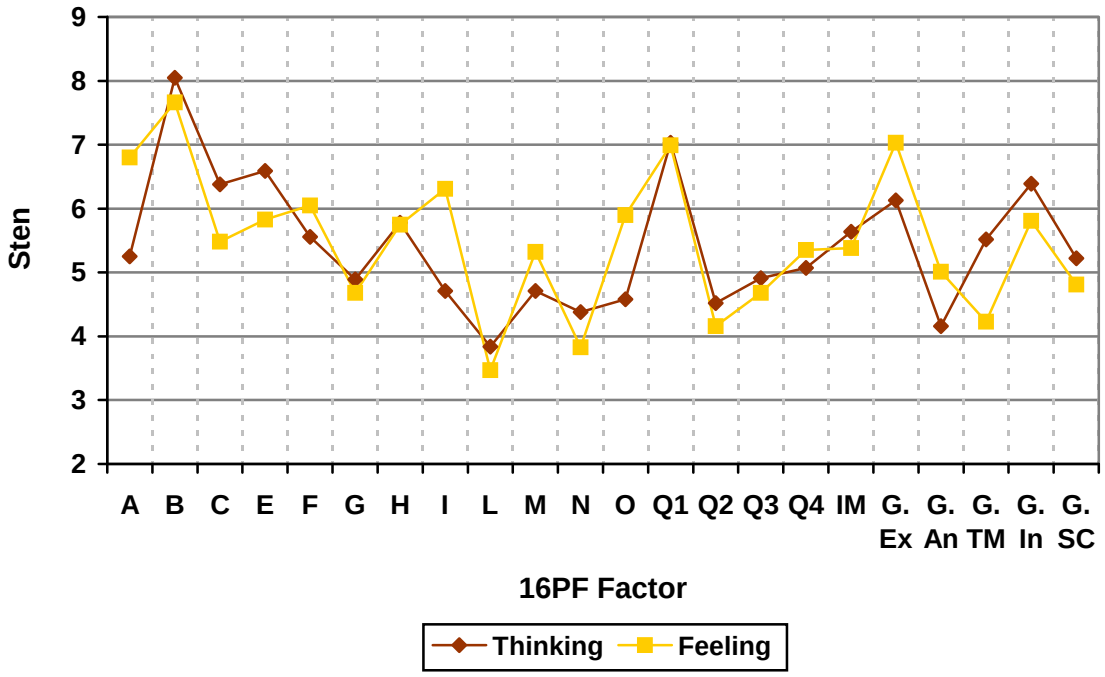
Feeling types tend to be more:

- Sensitive (I)
- Warm (A)
- Apprehensive (O).

These differences are illustrated graphically in Figure 2.11.

[24] Sten difference between Thinking and Feeling. Negative values indicate a higher score for Feeling.

Figure 2.11: Mean sten scores of Thinking and Feeling types on the 16PF scales (see Table 21.6 and footnote to Figure 2.9 for abbreviations)



Judging–Perceiving

Table 2.19 shows the mean sten score for Judging and for Perceiving types on each of the 16PF scales, the difference between the means and the statistical significance of this difference (based on an independent-samples t-test).

Table 2.19: 16PF differences between Judging and Perceiving

16PF Factor	Mean sten score		Sten difference [25]	Sig. (t-test)
	Judging	Perceiving		
A (Warmth)	5.63	5.60	0.03	
B (Reasoning)	7.84	8.19	–0.35	
C (Emotional Stability)	6.23	6.05	0.18	
E (Dominance)	6.30	6.60	–0.30	
F (Liveliness)	5.50	5.99	–0.49	*
G (Rule-Consciousness)	5.26	4.10	1.16	***
H (Social Boldness)	5.74	5.84	–0.10	
I (Sensitivity)	5.09	5.12	–0.03	
L (Vigilance)	3.69	3.86	–0.17	
M (Abstractness)	4.29	5.86	–1.57	***
N (Privateness)	4.19	4.35	–0.16	
O (Apprehension)	4.94	4.84	0.10	
Q1 (Openness to Change)	6.74	7.53	–0.79	***
Q2 (Self-Reliance)	4.42	4.45	–0.03	
Q3 (Perfectionism)	5.54	3.63	1.91	***
Q4 (Tension)	5.14	5.13	0.02	
IM (Impression Management)	5.67	5.41	0.26	
Global Extraversion	6.31	6.42	–0.11	
Global Anxiety	4.36	4.38	–0.02	
Global Tough-Mindedness	5.53	4.64	0.89	***
Global Independence	6.05	6.59	–0.54	***
Global Self-control	5.79	3.96	1.83	***

Difference significant at: *p<0.05, **p<0.01, ***p<0.001.

Looking at scales with a difference of at least one sten, Judging types tend to be more:

- Perfectionist (Q3)
- Rule-Conscious (G)
- and higher on Global Self-control.

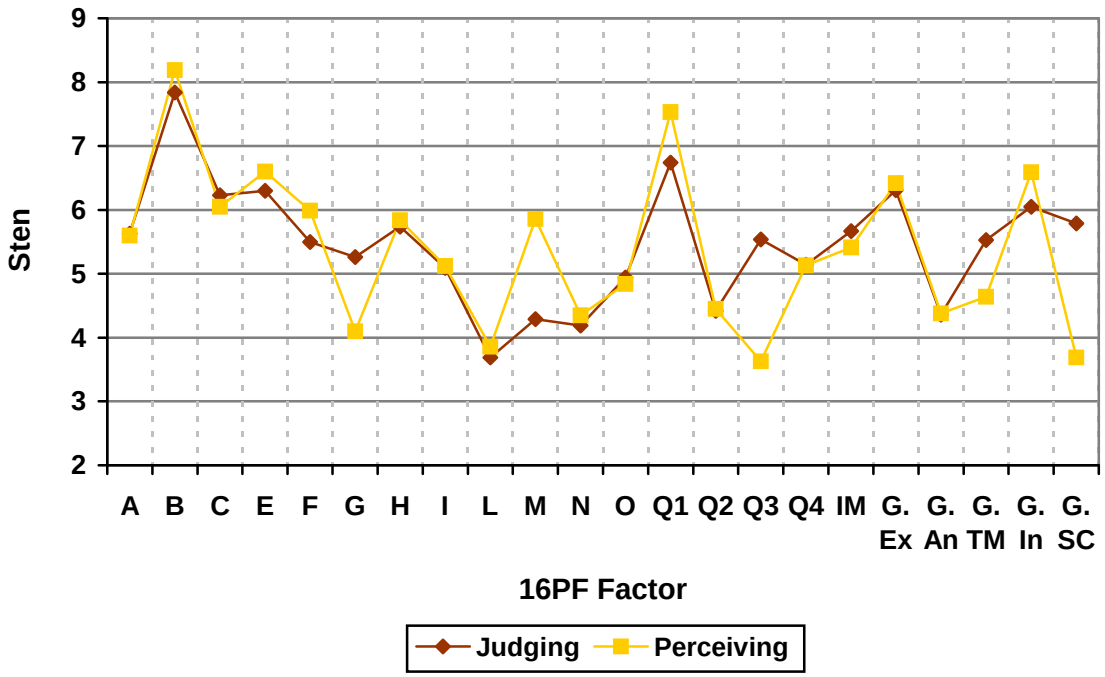
Perceiving types tend to be more:

- Abstract (M).

[25] Sten difference between Judging and Perceiving. Negative values indicate a higher score for Perceiving.

These differences are illustrated graphically in Figure 2.12.

Figure 2.12: Mean sten scores of Judging and Perceiving types on the 16PF scales (see Table 21.6 and footnote to Figure 2.9 for abbreviations)



Another way to look at the data is in terms of correlations between MBTI continuous scores and 16PF scores. These correlations are shown in Table 2.20.

Table 2.20: Correlation of MBTI continuous scores with the 16PF scores

16PF Factor	E–I	S–N	T–F	J–P
A (Warmth)	–0.50 ***	0.12 *	0.46 ***	0.10
B (Reasoning)	–0.04	0.09	–0.02	–0.02
C (Emotional Stability)	–0.18 ***	–0.04	–0.23 ***	–0.17 **
E (Dominance)	–0.31 ***	0.05	–0.25 ***	–0.04
F (Liveliness)	–0.59 ***	0.15 **	0.16 **	0.15 **
G (Rule-Consciousness)	0.18 ***	–0.30 ***	–0.10	–0.37 ***
H (Social Boldness)	–0.80 ***	0.16 **	0.05	0.03
I (Sensitivity)	–0.09	0.27 ***	0.47 ***	0.12 *
L (Vigilance)	0.19 ***	–0.16 **	–0.16 **	–0.03
M (Abstractness)	0.02	0.48 ***	0.12 *	0.43 ***
N (Privateness)	0.56 ***	–0.07	–0.26 ***	–0.08
O (Apprehension)	0.14 *	–0.06	0.34 ***	0.01
Q1 (Openness to Change)	–0.28 ***	0.57 ***	0.06	0.33 ***
Q2 (Self-Reliance)	0.47 ***	–0.12 *	–0.25 ***	–0.06
Q3 (Perfectionism)	0.07	–0.26 ***	–0.15 **	–0.58 ***
Q4 (Tension)	0.13 *	–0.03	0.00	–0.04
IM (Impression Management)	–0.02	–0.06	0.04	–0.17 **
Global Extraversion	–0.73 ***	0.18 ***	0.37 ***	0.12 *
Global Anxiety	0.26 ***	–0.10	0.15 **	0.01
Global Tough-Mindedness	0.27 ***	–0.57 ***	–0.37 ***	–0.37 ***
Global Independence	–0.49 ***	0.29 ***	–0.17 ***	0.17 ***
Global Self-control	0.28 ***	–0.45 ***	–0.18 ***	–0.63 ***

Significant at: *p<0.05, **p<0.01, ***p<0.001.

The highest correlates of each type dichotomy were therefore as follows:

E–I:	H (–0.80), Global Extraversion (–0.73), F (–0.59), N (0.56), A (0.50), Global Independence (–0.49), Q2 (0.47)
S–N:	Global Tough–Mindedness (–0.57), Q1 (0.57), M (0.48), Global Self–Control (–0.45)
T–F:	I (0.47), A (0.46)
J–P:	Global Self–Control (–0.63), Q3 (–0.58), M (0.43)

Unsurprisingly, there is a very similar picture here to that shown by the t-tests in Tables 2.16–2.19.

The relationship between whole type and the 16PF instrument

Table 2.21 shows a number of hypotheses which were generated by MBTI and 16PF experts about the relationship of whole type or combinations of letters to the 16PF instrument, and the extent to which the data support these.

Table 2.21: Hypotheses regarding whole type and the 16PF instrument

Hypothesis		Results	Supported?
ENFJ:	High on A and I	High on both	Yes
ENTJ:	Higher on E than non E – – J	Higher than most, but E – – P higher	No
ENTP:	F+, G–, H+, I–, M+, Q1+, Q3–	I midzone, otherwise all	Yes
ESFJ:	High on A and I Higher on E than –SFP A+, E+, F+, I+, L–, M–, Q2–	High on both False E low, otherwise all	Yes No Yes
ESFP:	Higher on Q1 than –S–J Higher on Q3 than –N–P	Yes Yes (ESFP mid; –N–P very low)	Yes Yes
ESTJ:	Higher on E than non E – – J Higher on F than ISTJ	True except for ENTP True	– Yes
ESTP:	Higher on Q1 than –S–J Higher on Q3 than –N–P	False True	No Yes
INFP:	Low to mid on A but high on I High on Q2	True False	Yes No
INTJ:	Higher on M than ENTJ	True	Yes
ISFJ:	Higher on E than –SFP Higher on Q3 than ESFJ or ESTJ	False True	No Yes
ISFP:	Low to mid on A but high on I Higher on Q1 than –S–J Higher on Q3 than –N–P A+, G–, I+, L–, M–, Q1–, Q3–	False. Mid on both False True Mixed	No No Yes –
ISTJ:	Higher on Q3 than ESTJ or ESFJ A–, E+, F–, I–, M–, Q1–, Q2+, Q3+	False All true except E	No Yes
ISTP:	Higher on Q1 than –S–J Higher on Q3 than –N–P	True except for ESTJ True	Yes Yes

Of 25 hypotheses, 15 (60%) were supported, two (8%) had mixed evidence and eight (32%) were rejected.

Table 2.22 shows the four ‘highest scoring’ and the four ‘lowest scoring’ types for each 16PF factor, with the mean sten score for each type. Looking at this table, it is remarkable how neatly type combinations relate to many of the 16PF factors. In the first line of the table, for example, the four types with the highest score on Factor A (Warmth) all have a preference for Extraversion and Feeling and the four types with the lowest score all have a preference for Introversion and Thinking.

Table 2.22: Whole type differences on the 16PF instrument

16PF Factor	Four 'highest' types	Four 'lowest' types		Four highest means		
				Four lowest means		
A (Warmth)	ESFP (7.8)	ISTP (4.0)	ISTJ	ISFJ	INFJ	INTJ
	ESFJ (7.3)	INTP (4.1)	ISTP	ISFP	INFP	INTP
	ENFP (7.2)	ISTJ (4.2)	ESTP	ESFP	ENFP	ENTP
	ENFJ (7.0)	INTJ (4.6)	ESTJ	ESFJ	ENFJ	ENTJ
B (Reasoning)	INTP (8.9)	ESFJ (7.2)	ISTJ	ISFJ	INFJ	INTJ
	INFJ (8.7)	ENFJ (7.3)	ISTP	ISFP	INFP	INTP
	INTJ (8.5)	ESTJ (7.6)	ESTP	ESFP	ENFP	ENTP
	ISTP (8.4)	ISFJ (7.7)	ESTJ	ESFJ	ENFJ	ENTJ
C (Emotional Stability)	ESTP (7.2)	ISFP (4.7)	ISTJ	ISFJ	INFJ	INTJ
	ESTJ (6.9)	ISFJ (4.8)	ISTP	ISFP	INFP	INTP
	ENTJ (6.6)	INFJ (5.0)	ESTP	ESFP	ENFP	ENTP
	ENTP (6.4)	INFP (5.3)	ESTJ	ESFJ	ENFJ	ENTJ
E (Dominance)	ENTP (7.3)	ISFP (4.8)	ISTJ	ISFJ	INFJ	INTJ
	ENTJ (7.3)	INFJ (5.1)	ISTP	ISFP	INFP	INTP
	ESTP (7.1)	ISFJ (5.1)	ESTP	ESFP	ENFP	ENTP
	ESTJ (6.9)	INFP (5.7)	ESTJ	ESFJ	ENFJ	ENTJ
F (Liveliness)	ESFP (7.0)	ISTJ (4.1)	ISTJ	ISFJ	INFJ	INTJ
	ENFP (6.8)	ISFP (4.1)	ISTP	ISFP	INFP	INTP
	ENTP (6.6)	INTJ (4.5)	ESTP	ESFP	ENFP	ENTP
	ENFJ (6.5)	INFJ (4.9)	ESTJ	ESFJ	ENFJ	ENTJ
	ESFJ (6.5)					
G (Rule-Consciousness)	ISFJ (6.0)	ENFP (3.6)	ISTJ	ISFJ	INFJ	INTJ
	INFJ (6.0)	ENTP (4.0)	ISTP	ISFP	INFP	INTP
	ISTJ (5.8)	INTP (4.0)	ESTP	ESFP	ENFP	ENTP
	INTJ (5.4)	ESFP (4.2	ESTJ	ESFJ	ENFJ	ENTJ
H (Social Boldness)	ENTJ (6.8)	ISFP (3.9)	ISTJ	ISFJ	INFJ	INTJ
	ESTJ (6.8)	ISFJ (4.1)	ISTP	ISFP	INFP	INTP
	ENFP (6.7)	ISTJ (4.1)	ESTP	ESFP	ENFP	ENTP
	ENFJ (6.7)	ISTP (4.5)	ESTJ	ESFJ	ENFJ	ENTJ
I (Sensitivity)	INFJ (7.2)	ESTP (3.9)	ISTJ	ISFJ	INFJ	INTJ
	ENFP (6.5)	ESTJ (4.2)	ISTP	ISFP	INFP	INTP
	ESFJ (6.4)	ISTP (4.5)	ESTP	ESFP	ENFP	ENTP
	INFP (6.4)	ISTJ (4.6)	ESTJ	ESFJ	ENFJ	ENTJ

L (Vigilance)	ISTP (4.8)	ENFJ (2.6)	ISTJ	ISFJ	INFJ	INTJ
	ISTJ (4.5)	ENTJ (3.4)	ISTP	ISFP	INFP	INTP
	INFJ (4.4)	ENFP (3.4)	ESTP	ESFP	ENFP	ENTP
	ISFP (4.1)	ESFP (3.4)	ESTJ	ESFJ	ENFJ	ENTJ
M (Abstractness)	ENFP (6.9)	ESTJ (3.5)	ISTJ	ISFJ	INFJ	INTJ
	INFP (6.9)	ESFJ (3.8)	ISTP	ISFP	INFP	INTP
	ENTP (6.1)	ISTJ (3.9)	ESTP	ESFP	ENFP	ENTP
	ISFP (6.0)	ISFJ (4.2)	ESTJ	ESFJ	ENFJ	ENTJ
N (Privateness)	ISTP (6.2)	ENFJ (2.4)	ISTJ	ISFJ	INFJ	INTJ
	INTP (6.1)	ESFP (2.8)	ISTP	ISFP	INFP	INTP
	ISTJ (5.4)	ESFJ (3.0)	ESTP	ESFP	ENFP	ENTP
	ISFJ (5.3)	ESTP (3.3)	ESTJ	ESFJ	ENFJ	ENTJ
O (Apprehension)	INFJ (7.4)	ESTP (3.8)	ISTJ	ISFJ	INFJ	INTJ
	ISFP (6.4)	ESTJ (4.1)	ISTP	ISFP	INFP	INTP
	ISFJ (6.1)	ENTP (4.4)	ESTP	ESFP	ENFP	ENTP
	ESFP (6.1)	ENTJ (4.4)	ESTJ	ESFJ	ENFJ	ENTJ
Q1 (Openness to Change)	ENTP (8.2)	ISTJ (5.5)	ISTJ	ISFJ	INFJ	INTJ
	ENFP (8.2)	ISFP (5.7)	ISTP	ISFP	INFP	INTP
	ENFJ (8.0)	ISFJ (6.0)	ESTP	ESFP	ENFP	ENTP
	ENTJ (7.9)	ESFJ (6.1)	ESTJ	ESFJ	ENFJ	ENTJ
Q2 (Self-Reliance)	INTP (5.7)	ESFJ (3.2)	ISTJ	ISFJ	INFJ	INTJ
	ISFP (5.7)	ESTJ (3.7)	ISTP	ISFP	INFP	INTP
	ISTJ (5.6)	ENFJ (3.7)	ESTP	ESFP	ENFP	ENTP
	INFJ (5.6)	ENTP (3.8)	ESTJ	ESFJ	ENFJ	ENTJ
Q3 (Perfectionism)	ISFJ (6.0)	ISFP (2.9)	ISTJ	ISFJ	INFJ	INTJ
	ESFJ (5.8)	ENTP (3.2)	ISTP	ISFP	INFP	INTP
	ESTJ (5.8)	ENFP (3.5)	ESTP	ESFP	ENFP	ENTP
	ISTJ (5.7)	INFP (3.6)	ESTJ	ESFJ	ENFJ	ENTJ
Q4 (Tension)	ESFJ (5.9)	ENFP (4.5)	ISTJ	ISFJ	INFJ	INTJ
	ISFP (5.8)	INTJ (4.9)	ISTP	ISFP	INFP	INTP
	INFP (5.6)	ENTP (4.9)	ESTP	ESFP	ENFP	ENTP
	ISFJ (5.6)	ESTJ (4.9)	ESTJ	ESFJ	ENFJ	ENTJ
IM (Impression Management)	INTJ (5.9)	ISFJ (4.7)	ISTJ	ISFJ	INFJ	INTJ
	ESTJ (5.9)	ISFP (4.9)	ISTP	ISFP	INFP	INTP
	ISTJ (5.8)	INFP (4.9)	ESTP	ESFP	ENFP	ENTP
	ENFJ (5.7)	ISTP (5.2)	ESTJ	ESFJ	ENFJ	ENTJ
	ENFP (5.7)					

Global Extraversion	ENFJ (8.0)	ISTJ (4.4)	ISTJ	ISFJ	INFJ	INTJ
	ESFJ (8.0)	ISTP (4.5)	ISTP	ISFP	INFP	INTP
	ESFP (7.8)	INTP (4.6)	ESTP	ESFP	ENFP	ENTP
	ENFP (7.8)	ISFP (4.7)	ESTJ	ESFJ	ENFJ	ENTJ
Global Anxiety	INFJ (6.1)	ESTP (3.4)	ISTJ	ISFJ	INFJ	INTJ
	ISFP (6.0)	ESTJ (3.7)	ISTP	ISFP	INFP	INTP
	ISFJ (5.5)	ENTJ (3.9)	ESTP	ESFP	ENFP	ENTP
	ESFJ (5.2)	ENTP (4.0)	ESTJ	ESFJ	ENFJ	ENTJ
Global Tough-Mindedness	ISTJ (6.8)	ENFP (3.0)	ISTJ	ISFJ	INFJ	INTJ
	ESTP (6.2)	INFP (3.6)	ISTP	ISFP	INFP	INTP
	ESTJ (6.2)	ENFJ (3.7)	ESTP	ESFP	ENFP	ENTP
	ISTP (5.9)	INFJ (3.8)	ESTJ	ESFJ	ENFJ	ENTJ
Global Independence	ENTP (7.5)	ISFP (4.4)	ISTJ	ISFJ	INFJ	INTJ
	ENTJ (7.1)	ISFJ (4.6)	ISTP	ISFP	INFP	INTP
	ESTP (6.8)	INFJ (5.0)	ESTP	ESFP	ENFP	ENTP
	ESTJ (6.7)	ISTJ (5.0)	ESTJ	ESFJ	ENFJ	ENTJ
Global Self-Control	ISTJ (6.5)	ENFP (3.2)	ISTJ	ISFJ	INFJ	INTJ
	ISFJ (6.4)	ENTP (3.5)	ISTP	ISFP	INFP	INTP
	ESTJ (6.0)	INFP (3.9)	ESTP	ESFP	ENFP	ENTP
	INTJ (5.9)	INTP (4.3)	ESTJ	ESFJ	ENFJ	ENTJ

Note: these results should be treated with caution, as the sample sizes for some types – notably INFJ and ISFP – are small.

In summary therefore, comparing type dichotomies to the 16PF factors, it can be seen that:

- Extraverts are significantly more Socially Bold (H), Lively (F), Warm (A), Dominant (E), Extravert and Independent than Introverts. Introverts are more Private (N) and Self-Reliant (Q2).
- Sensing types are more Perfectionist (Q3), Tough-Minded and Self-Controlled than Intuitives. Intuitive types are more Open to Change (Q1) and Abstract (M).
- Thinking types are more Tough-Minded than Feeling types, who are on average more Sensitive (I), Warm (A) and Apprehensive (O).
- Judging types are more Perfectionist (Q3), Rule-Conscious (G) and Self-Controlled than Perceiving types. Perceiving types are more Abstract (M).
- Similar results are found when MBTI continuous scores are correlated with 16PF scores. The pattern of the results is broadly similar to that shown from earlier data.

In addition, a number of hypotheses were made about the relationship of whole type to the 16PF factors, with the data shown to support the majority (60%) of these. The neat fit in terms of how whole type relates to the 16PF factors supports the views of MBTI practitioners that it is useful to look at whole type, rather than just at the four type dichotomies separately.

In summary, there is good evidence for the validity of the European English MBTI Step I instrument. Specifically:

- There is a high level of agreement between best-fit and reported type.
- Respondents of different types have shown preferences for different types of organisational cultures and jobs that are consistent with what we would expect from type theory.
- Scores on the MBTI Step I dimensions show clear relationships in the expected direction with scores on other instruments that measure related psychological constructs.

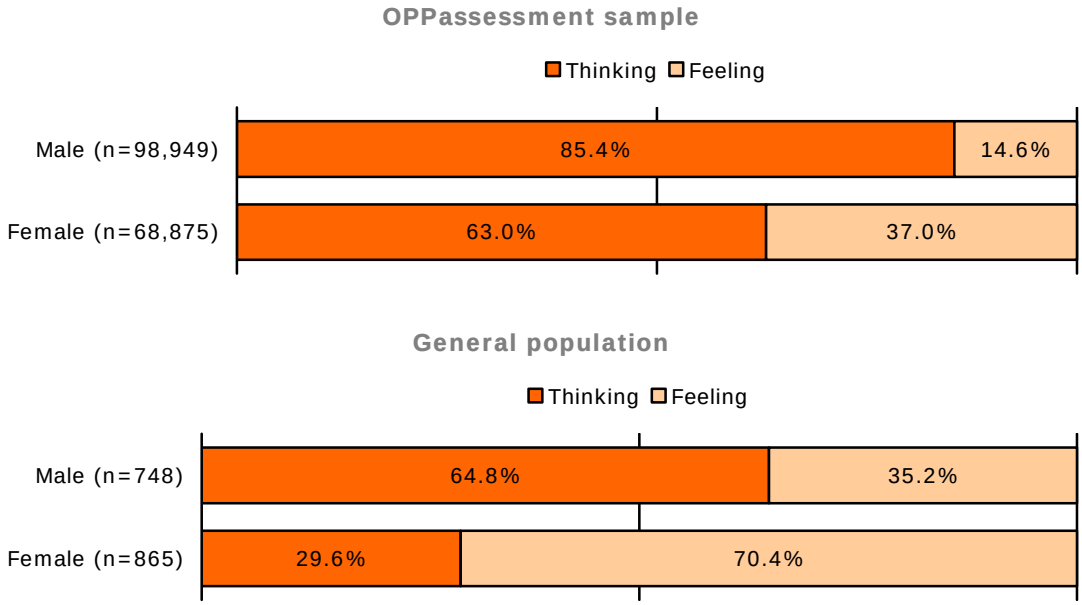
Group differences in type

The large OPPassessment sample was used to explore group differences in type. Two other samples (the general UK population and outplacement interviewing and counselling) also contained gender and/or age data that could be analysed, and these data were also incorporated. The relationship of type to each of these factors is described below.

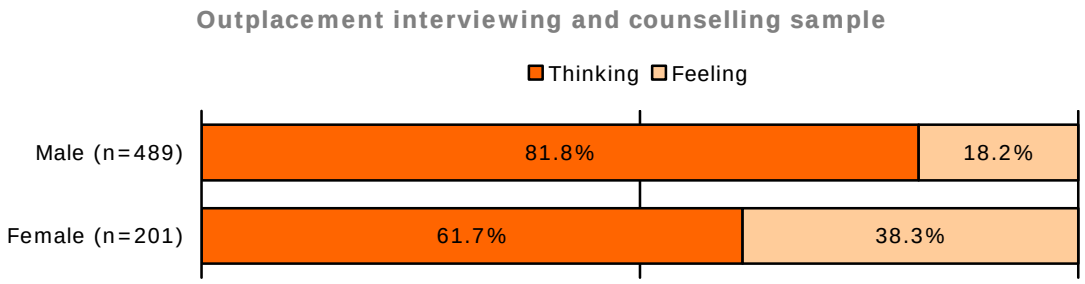
Gender

Across countries, most groups who complete the MBTI questionnaire show a significant gender difference on the Thinking–Feeling dimension, and this is the case for the three groups analysed here, as shown in Figure 2.13:[26]

Figure 2.13: Gender differences on the T–F dimension



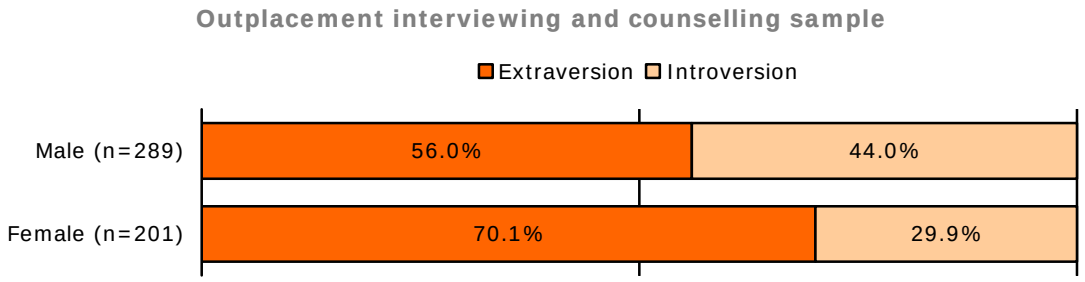
[26] OPPassessment sample: χ^2=11,168.47; significant at p<0.001. General population sample: χ^2=180.50; significant at p<0.01. Outplacement interviewing and counselling sample: χ^2=31.53; significant at p<0.001. Data for the UK general population sample reproduced from *European English MBTI Step I Manual Supplement* (1998) with kind permission of CPP Inc.



Thinking preferences are over-represented amongst men and Feeling preferences are over-represented amongst women. This effect has been found many times with many different language versions of the MBTI instrument in a number of different cultures. Although the gender difference is consistent, the proportion of both women and men with a preference for Thinking is higher in professional and managerial groups than in the UK population in general.

For the outplacement interviewing and counselling sample, gender differences were also found on the Extraversion–Introversion dimension.[27] This is shown in Figure 2.14:

Figure 2.14: Gender differences on the E–I dimension



For this group, Introversion preferences are over-represented amongst men and Extraversion preferences are over-represented amongst women.

Age

Previous research using UK Step I continuous scores has shown significant correlations between age and three of the four dimensions (Warr, Miles and Platts, 2001). Older people were more likely than younger people to have preferences for Introversion, Sensing and Judging.

The data in this supplement were analysed in a slightly different way, by looking for differences in average age between people with

[27] $\chi^2=11.84$; significant at $p<0.001$.

preferences for Extraversion versus those with preferences for Introversion, for Sensing versus Intuition, for Thinking versus Feeling and for Judging versus Perceiving. The two samples for which age data were analysed (OPPassessment and outplacement) showed a statistically significant and meaningful relationship between age and only one of the dimensions,[28] as shown in Table 2.23. The mean age of people with a preference for Introversion was between one and two years higher than of those with a preference for Extraversion. Although statistically, significant, the difference is still small in real terms. Differences for the other three dimensions were in the region of one year or less.

Table 2.23: Significant mean age differences

	Mean age (years)		Difference	Sig.
	Extraversion	Introversion		
OPPassessment sample	36.71	38.10	1.39	***
Outplacement sample	42.46	44.23	1.77	**

Difference significant at: *p<0.05, **p<0.01, ***p<0.001.

Ethnic origin

Research conducted on the UK general population sample during the development of the MBTI Step I questionnaire was confined to looking at differences between the majority group and minorities as a general category.[29] This was because there were insufficient data from individual ethnic groups to allow separate analyses.

The only dimension showing significant ethnic differences in this sample was Judging–Perceiving:[30] 82% of the minority group were found to have a preference for Judging, compared with 57% of the white majority group.

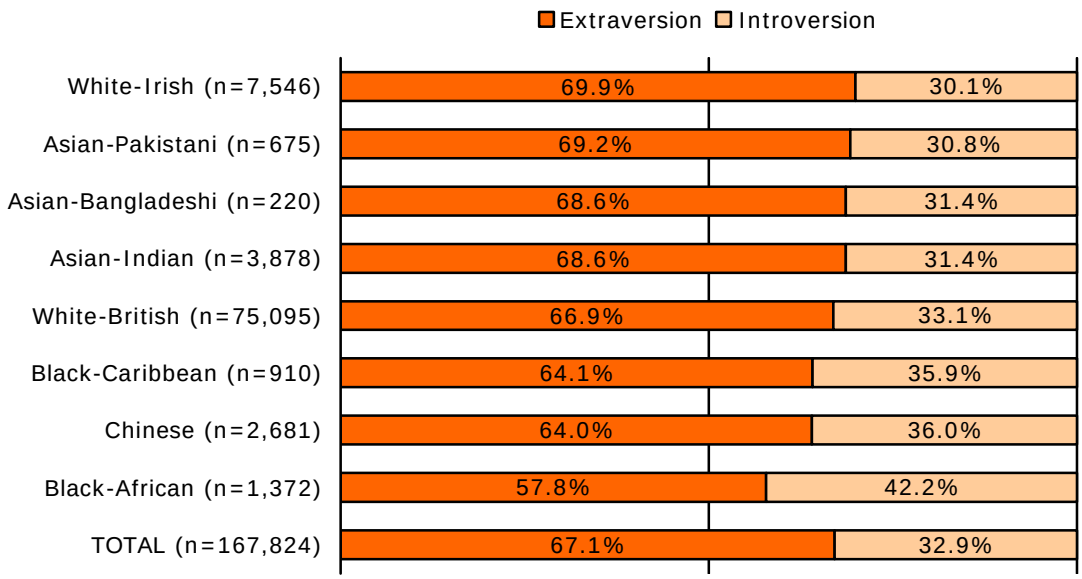
The more recent collection of a large amount of data from OPPassessment has allowed a further, more detailed, exploration of ethnic differences. In the figures that follow, ethnic origin categories used by OPPassessment have been re-ordered according to the percentage of E, S, T or J (categories described as 'Other' have been omitted).

The key finding is that differences between different minority groups are just as prevalent as those between the majority group (White-British) and the minority groups. This is an observation that can only be made on the basis of a very large sample size such as is provided here.

[28] Based on the results from independent-samples t-tests.
[29] Reproduced from *European English MBTI Step I Manual Supplement* (1998) with kind permission of CPP Inc.
[30] χ^2=11.21; significant at p<0.001. Reproduced from *European English MBTI Step I Manual Supplement* (1998) with kind permission of CPP Inc.

At the individual dimension level, few clear patterns emerge other than that distributions do vary across people of different ethnic origins by up to about 12% on each dimension. Perhaps the most notable finding is that people of Black-African origin are more likely to have preferences for Introversion, Sensing, Thinking and Judging than other groups. People of White-Irish origin, on the other hand, are more likely to have preferences for Extraversion, Feeling and Perceiving than other groups.

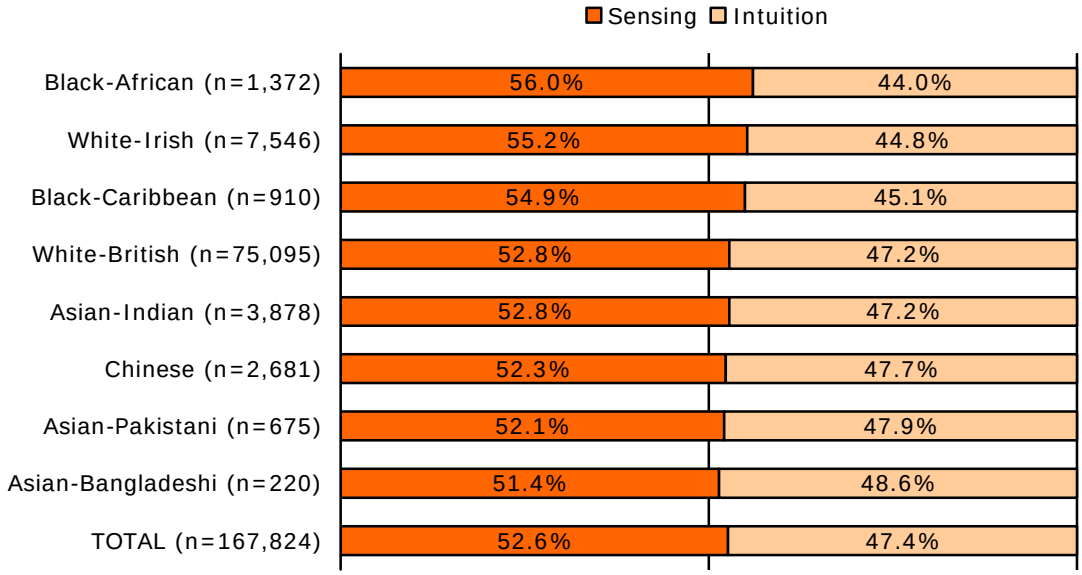
Figure 2.15: Extraversion–Introversion[31] and ethnic origin



NB: The total above includes ethnic origin groups not shown, and is therefore greater than the sum of the ethnic origin groups in the figure.

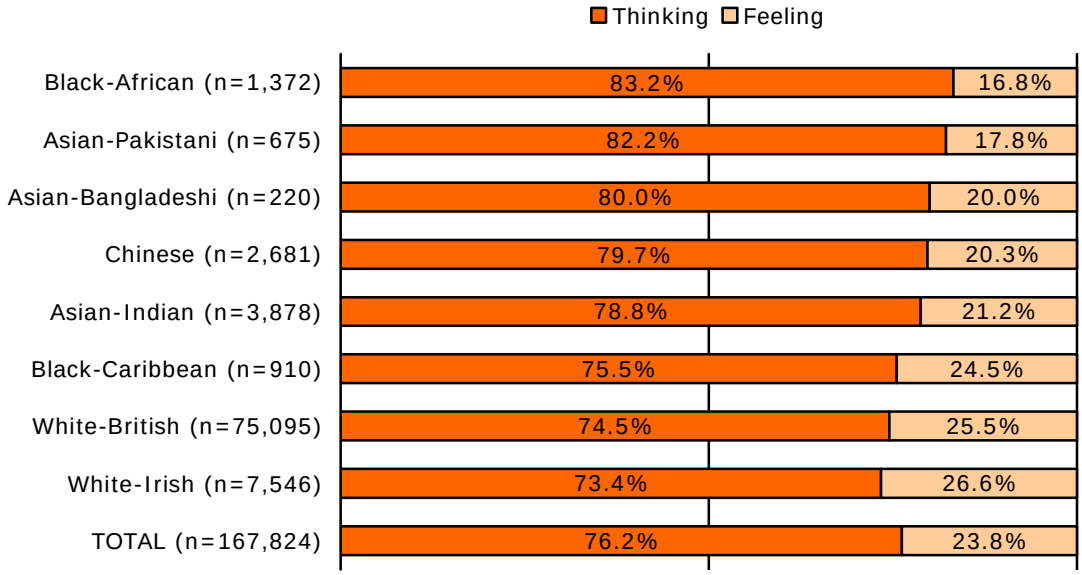
[31] $\chi^2=294.04$; significant at $p<0.001$.

Figure 2.16: Sensing–Intuition[32] and ethnic origin



NB: The total above includes ethnic origin groups not shown, and is therefore greater than the sum of the ethnic origin groups in the figure.

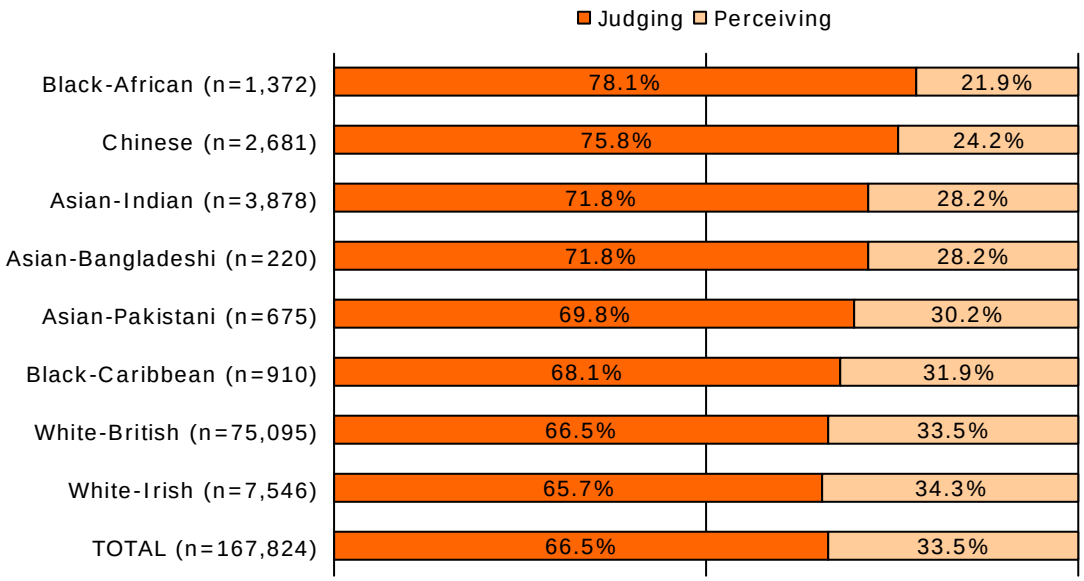
Figure 2.17: Thinking–Feeling[33] and ethnic origin



NB: The total above includes ethnic origin groups not shown, and is therefore greater than the sum of the ethnic origin groups in the figure.

[32] $\chi^2=100.33$; significant at $p<0.001$.
[33] $\chi^2=450.84$; significant at $p<0.001$.

Figure 2.18: Judging–Perceiving[34] and ethnic origin



NB: The total above includes ethnic origin groups not shown, and is therefore greater than the sum of the ethnic origin groups in the figure.

Occupational level

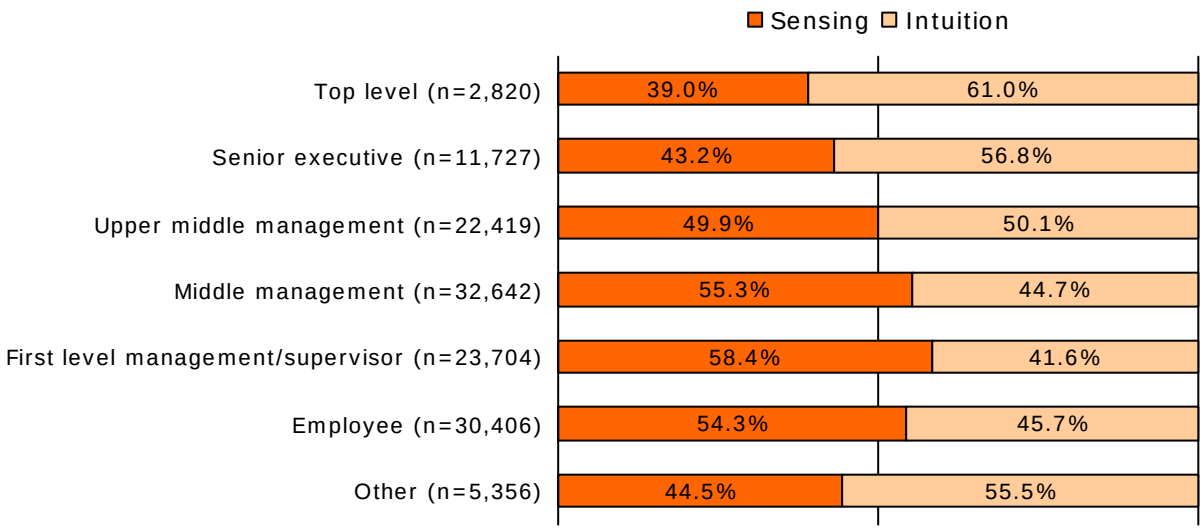
Previous research in other countries has demonstrated that individuals in higher-level jobs in organisations are more likely to have preferences for Intuition and for Thinking than those in lower-level jobs (Quenk, Hammer and Majors, 2004).

This is reflected in the relationship of the Sensing–Intuition and Thinking–Feeling dimensions with occupational level in the OPPassessment sample.

The data suggest that individuals at the top level are most likely to have a preference for Intuition, followed by senior executives and those in upper middle management. The proportions of people with preferences for Intuition were lowest amongst those from middle management down to employee level, as shown in Figure 2.19.

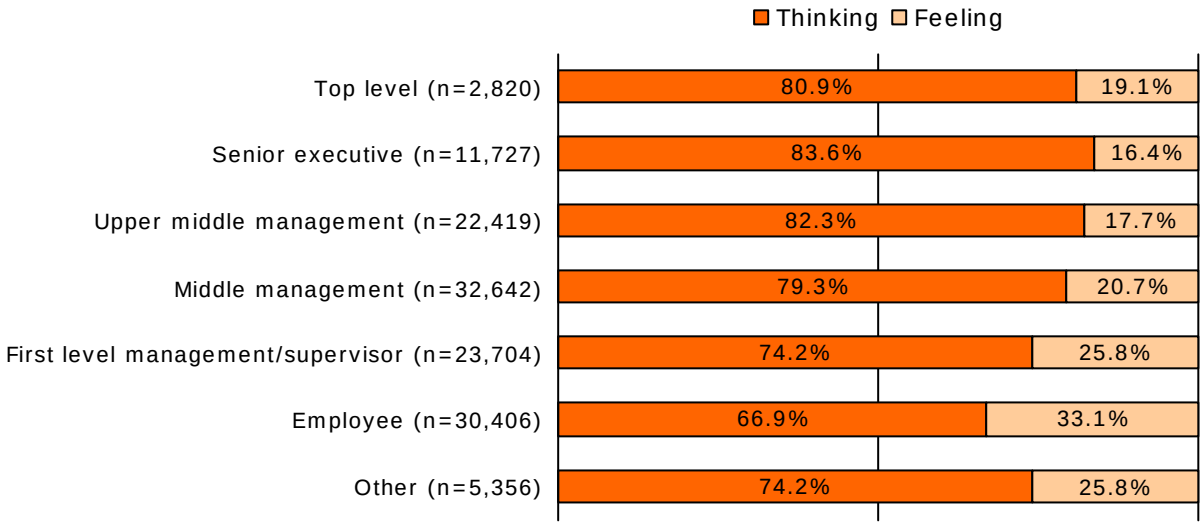
[34] χ^2=446.55; significant at $p<0.001$.

Figure 2.19: Sensing–Intuition[35] and occupational level (OPPassessment data)



It was also found that those with preferences for Thinking are slightly under-represented at employee level and (to some extent) first-level management/supervisor level, as shown in Figure 2.20. All other levels contained a similar (higher) proportion of Thinking types.

Figure 2.20: Thinking–Feeling[36] and occupational level (OPPassessment data)



[35] χ^2=1287.59; significant at p<0.001.
[36] χ^2=2552.45; significant at p<0.001.

Education

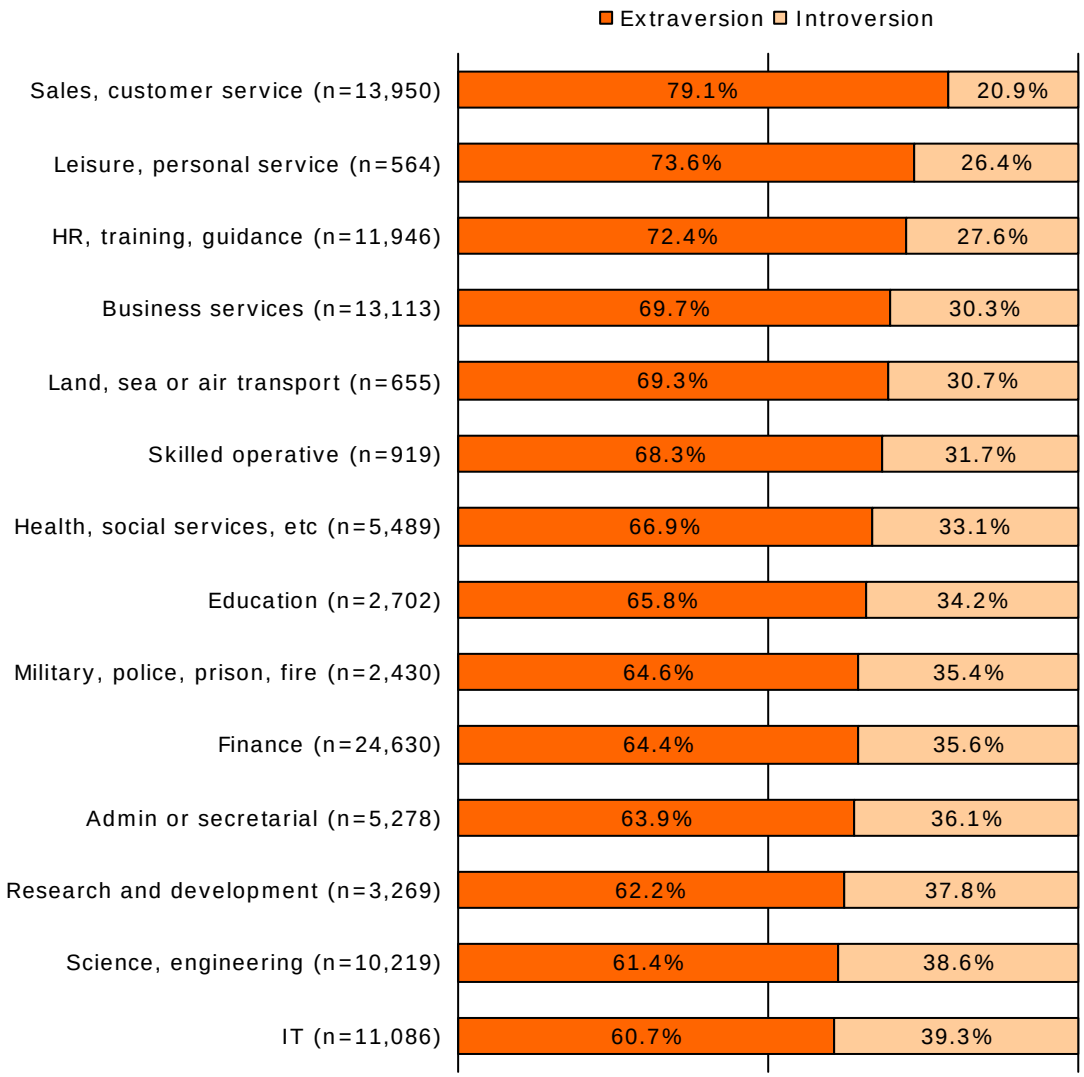
Specific educational qualifications were not collected for the OPPassessment sample; however, the age at which individuals left full-time education was. Those who left full-time education at an older age were significantly more likely to have preferences for Intuition, Thinking and/or Perceiving.[37] However, although statistically significant, the differences were all less than one year in real terms.

Work area

Previous research into MBTI type suggests that an individual's type influences their choice of career (Hammer, 1998), and indeed the data in this supplement show that there is a statistically significant relationship between three of the dimensions and work area, the exception being the Judging–Perceiving dimension. In the figures that follow, categories have been re-ordered according to the percentage of E, S or T (work areas with fewer than 100 respondents have been omitted as have undefined work areas described as 'Other').

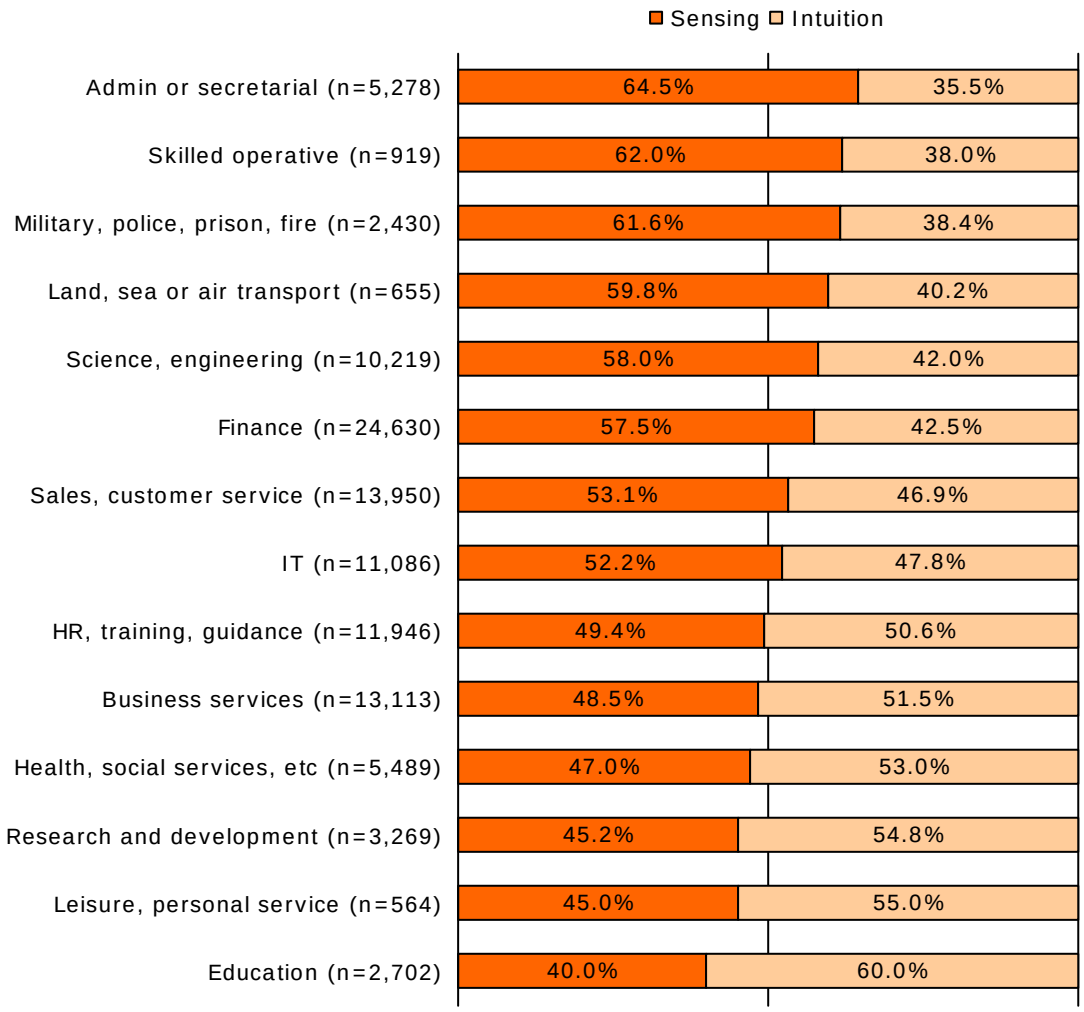
[37] Based on an independent-samples t-test; all significant at $p<0.001$.

Figure 2.21: Extraversion–Introversion[38] and work area



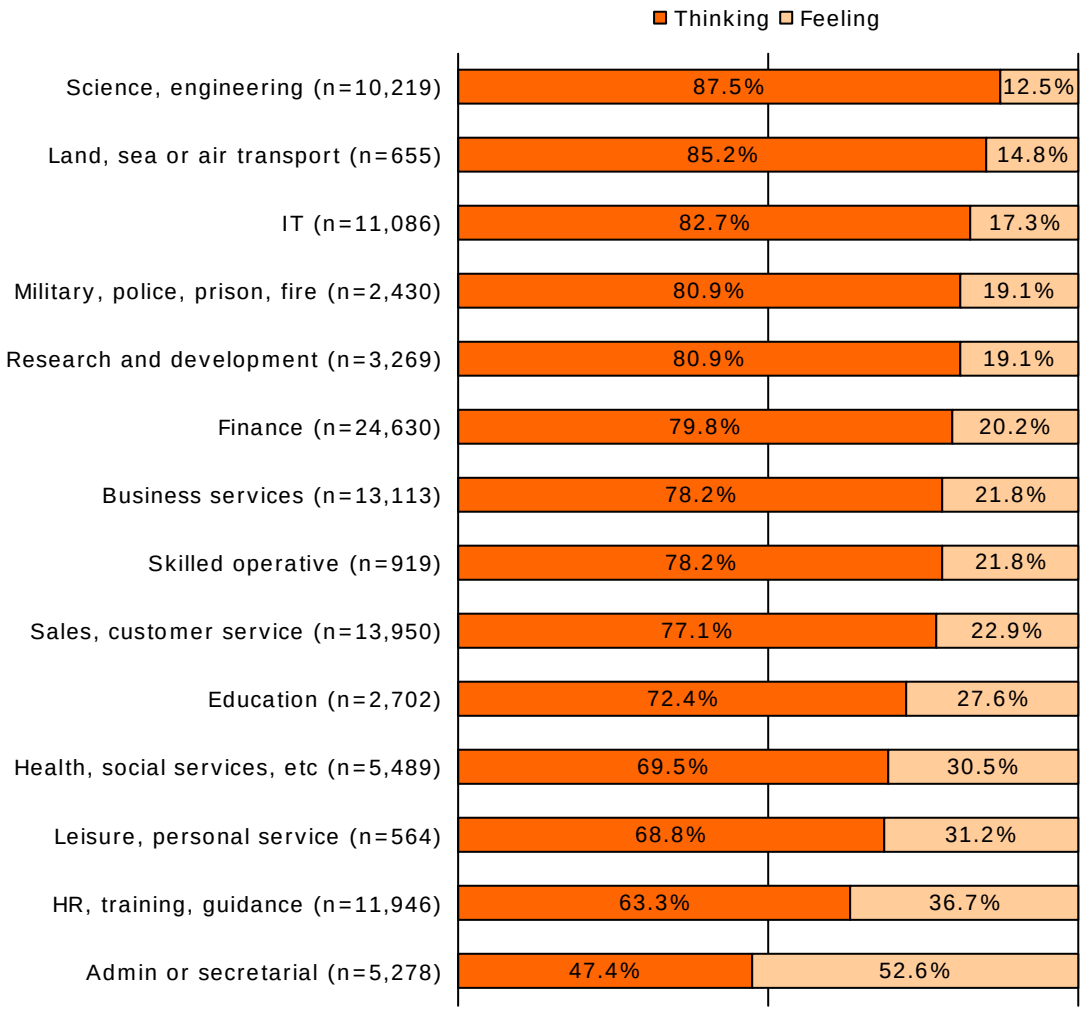
[38] χ^2=1802.20; significant at p<0.001.

Figure 2.22: Sensing–Intuition[39] and work area



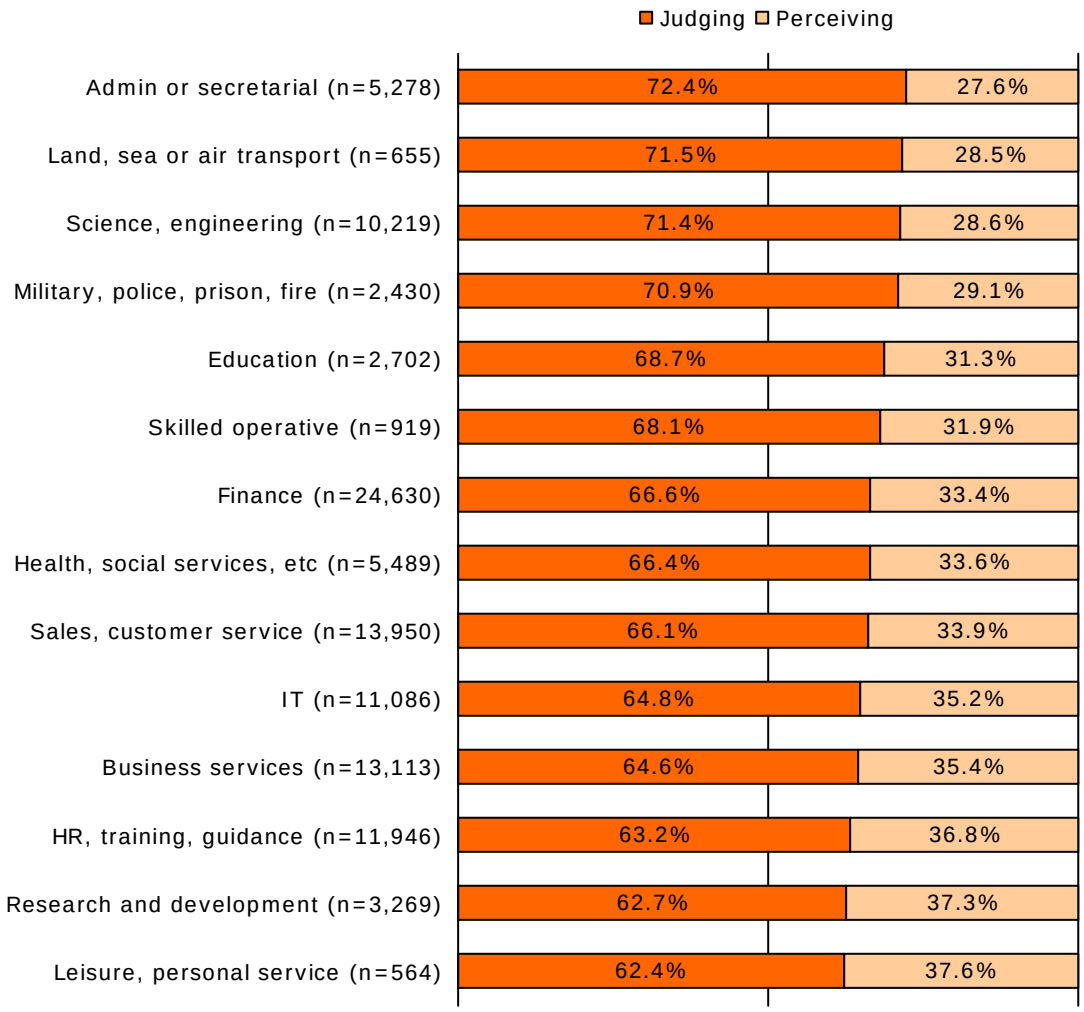
[39] χ^2=1375.62; significant at p<0.001.

Figure 2.23: Thinking–Feeling[40] and work area



[40] χ^2=4993.01; significant at p<0.001.

Figure 2.24: Judging–Perceiving[41] and work area



[41] χ^2=356.44; significant at p<0.001.

Nationality

Information on nationality was available for the OPPassessment group. Seventy per cent of the group were British. Although a number of other European nationalities were represented in fairly large numbers, it would normally be expected for these people to complete the instrument in their own first language. Therefore national differences have not been explored using the European English version of the instrument. The exception to this is for people who described themselves as Irish. These formed approximately 5% of the group.

Type distributions for the people from the OPPassessment sample who described themselves as British and Irish are compared in Tables 2.24–2.26. Analysis suggested that there were significant differences between the type distributions. However, these levels of significance were a result the very large sample sizes and, in real terms, the type distributions are very similar.

Table 2.24: Type table for British OPPassessment respondents (reported type, n=88,394)

ISTJ	ISFJ	INFJ	INTJ
n=10,898 12.3% SSR=0.90	n=2,691 3.0% SSR=0.24**	n=1,287 1.5% SSR=0.85	n=4,965 5.6% SSR=3.99**
ISTP	**ISFP**	**INFP**	**INTP**
n=2,731 3.1% SSR=0.48**	n=721 0.8% SSR=0.13**	n=1,447 1.6% SSR=0.51**	n=4,363 4.9% SSR=2.02**
ESTP	**ESFP**	**ENFP**	**ENTP**
n=4,433 5.0% SSR=0.86	n=1,753 2.0% SSR=0.23**	n=4,681 5.3% SSR=0.84	n=9,341 10.6% SSR=3.84**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=17,275 19.5% SSR=1.88**	n=5,908 6.7% SSR=0.53**	n=4,144 4.7% SSR=1.70**	n=11,756 13.3% SSR=4.53**

Type	n	%
E	59,291	67.1%**
I	29,103	32.9%**
S	46,410	52.5%**
N	41,984	47.5%**
T	65,762	74.4%**
F	22,632	25.6%**
J	58,924	66.7%**
P	29,470	33.3%**

*Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

Table 2.25: Type table for Irish OPPassessment respondents (reported type, n=7,710)

ISTJ	ISFJ	INFJ	INTJ
n=880 11.4% SSR=0.83**	n=253 3.3% SSR=0.26**	n=85 1.1% SSR=0.64*	n=367 4.8% SSR=3.38**
ISTP	**ISFP**	**INFP**	**INTP**
n=239 3.1% SSR=0.48**	n=68 0.9% SSR=0.14**	n=114 1.5% SSR=0.46**	n=308 4.0% SSR=1.63**
ESTP	**ESFP**	**ENFP**	**ENTP**
n=483 6.3% SSR=1.08	n=196 2.5% SSR=0.29**	n=393 5.1% SSR=0.81*	n=725 9.4% SSR=3.41**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=1,665 21.6% SSR=2.08**	n=630 8.2% SSR=0.65**	n=352 4.6% SSR=1.66**	n=952 12.3% SSR=4.20**

Type	n	%
E	5,396	70.0%**
I	2,314	30.0%**
S	4,414	57.3%**
N	3,296	42.7%**
T	5,619	72.9%**
F	2,091	27.1%**
J	5,184	67.2%**
P	2,526	32.8%**

*Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

Table 2.26: Summary of differences by nationality

	E	I	S	N	T	F	J	P
British (n=88,394)	67%	33%	52%	48%	74%	26%	67%	33%
Irish (n=7,710)	70%	30%	57%	43%	73%	27%	67%	33%

Employment status

Employment status information was available for the OPPassessment sample. Analysis revealed statistically significant differences across the groups on two dimensions, namely Thinking–Feeling and Judging–Perceiving. Amongst those in employment, self-employed people were considerably more likely to have a preference for Intuition, and slightly more likely to have a preference for Perceiving, than those who described themselves as working full-time or part-time. Those who worked full-time were more likely to have a preference for Thinking than those who were self-employed who, in turn, were more likely to have a preference for Thinking than those who worked part-time. The Thinking–Feeling pattern is likely to be a gender effect; 87% of part-time workers were female, compared with 40% of the total group and 38% of full-time workers.

Appendix 1: Sample descriptions

Sample 1: UK general population sample[42]

This sample consists of 1,634 individuals, specifically sampled by the Office of National Statistics (ONS) to be representative of the UK general population. The group completed a version of the MBTI questionnaire in 1996 during the initial development of the European Step I questionnaire.

The data were collected as part of the ONS's monthly 'Omnibus' survey, whereby each month approximately 2,000 adults aged 16 years or older are interviewed. A sample of 100 postal sectors is selected each month, stratified by region, by proportion of households renting from local authorities, and by socio-economic group. Within each sector, 30 addresses are selected randomly and a letter is sent to each address requesting their cooperation. Within each household, one person is selected at random, and interviewed. The Omnibus sampling method is thus random.

In total, 54% of the respondents were female and 46% were male. Also, 96% described their ethnicity as white, and 4% described themselves as belonging to a minority group.

The age range was as follows:

Age (years)	Percentage
16–29	23.7%
30–49	49.7%
50–65	26.6%

A broad range of occupational levels was represented, with the largest single group being employee level (44%), as shown below:

Occupational level	Percentage
Top level	0.9%
Senior executive	3.0%
Upper middle management	6.5%
Middle management	20.0%
First-level management/supervisor	9.7%
Employee	43.7%
Other	16.2%

[42] Reproduced from *European English MBTI Step I Manual Supplement* (1998) with kind permission of CPP Inc.

The age at which individuals left full-time education was as follows:

Occupational level (years)	Percentage
<15	24.3%
16–18	50.5%
19–21	9.7%
22–25	8.8%
26+	2.7%
Still in education	4.0%

The majority of the group were in full-time or part-time employment:

Employment status	Percentage
Full-time	44.2%
Part-time	17.7%
Self-employed	7.4%
Unemployed (seeking work)	7.8%
Unemployed (not seeking work)	5.3%
Retired	8.3%
Homemaker	9.4%

Sample 2: Data from OPPassessment (representative European English-speaking professional and managerial sample)

This sample consists of 167,824 individuals who completed the MBTI Step I questionnaire in European English via the OPPassessment system between March 2003 and June 2008. Of these respondents, 59% were male and 41% were female. Age ranged from 20 to 90 years, with a mean of 37 and median of 36.

Nationality was given by 85% of the respondents. Of these, 62% were British and 5% were Irish. Many other nationalities were represented, but each formed less than 3% of the total group.

Nationality	Percentage
British	62.2%
Irish	5.4%
Other	32.4%

Ethnic origin was provided by 76% of respondents. Of these, 59% were White-British. Many other ethnic origins were represented.

Ethnic origin	Percentage
White-British	58.8%
White-Irish	5.9%
Asian-Indian	3.0%
Chinese	2.1%
Black-African	1.1%
Black-Caribbean	0.7%
Asian-Pakistani	0.5%
Asian-Bangladeshi	0.2%
Other	27.6%

The majority of the group were in full-time employment:

Employment status	Percentage
Full-time	93.5%
Part-time	4.0%
Self-employed	1.8%
Unemployed	0.6%
Retired	0.1%
Homemaker	0.1%

The majority of the group were of managerial level or above, with the largest single groups being middle management (25%) and employee level (24%):

Occupational level	Percentage
Top level	2.2%
Senior executive	9.1%
Upper middle management	17.4%
Middle management	25.3%
First level management/supervisor	18.4%
Employee	23.6%
Other	4.1%

And a range of work areas were represented:

Work area (job type)	Percentage
Finance	18.9%
Sales, customer service	10.7%
Business services	10.1%
HR, training, guidance	9.2%
IT	8.5%
Science, engineering	7.8%
Health, social services, etc	4.2%
Admin or secretarial	4.0%
Research and development	2.5%
Education	2.1%
Military, police, prison, fire	1.9%
Skilled operative	0.7%
Land, sea or air transport	0.5%
Leisure, personal service	0.4%
Unskilled operative	0.1%
Other public sector	5.4%
Other private sector	4.7%
Other	8.4%

Sample 3: Management development programme participants

The sample consisted of 4,575 UK participants on management development programmes at Ashridge Business School, run between 2000 and 2003. Of this group, 77% were male and 23% female. Ages ranged from 21 to 67 years.

Sample 4: Outplacement interviewing and counselling sample

The sample consisted of 695 individuals who completed the MBTI Step I questionnaire (or knew their MBTI reported type) and the 16PF (5th edition) questionnaire as part of outplacement interviewing and counselling between September 1997 and June 2003. Of this group, 71% were male and 29% female. Age was available for 451 individuals (65%) and ranged from 21 to 61 years with a mean of 43.

Appendix 2: Full analysis of Adjective Check List data[43]

Table 2A1.1 shows predicted relationships and actual correlations between MBTI continuous scores and all 164 items of an adjective checklist (ACL) administered to the UK population sample.

To aid quick review of the table, the 'Relationship' column has been added to show the direction of the stronger relationships that were found (where correlations are 0.1 or above and where the result is significant at the $p<0.01$ level).

Relationships predicted by the author of the original research prior to the analysis of the data are shown in the column headed 'Prediction'. Those predictions that are supported by the data at the $p<0.01$ level are shown in bold in this column of the table. As can be seen, most of the predictions were supported by the data, thus providing further evidence of the validity of the Step I instrument.

It should be remembered that most of the correlations in this table are weak, eg a correlation of 0.2 accounts for only 4% of the variance in the data and a correlation of 0.1 for 1% of the variance. Therefore, the findings should be interpreted tentatively (eg "*Extraverts* ***tend*** *to describe themselves as 'active' "*). The data should not be used as the basis for generalisations such as "***All*** *Extraverts describe themselves as 'active'* " or less accurate still "***All*** *Extraverts* ***are*** *'active'* ".

[43] Reproduced from *European English MBTI Step I Manual Supplement* (1998) with kind permission of CPP Inc.

Table 2A1.1: Correlations of UK MBTI Step I continuous scores with ACL items (n=1,634)[44]

ACL word	Prediction	E–I	S–N	T–F	J–P	Relationship
absent-minded	_**N**_**P**	0.09**	0.07**	0.10**	0.16**	__FP
active	**E**___	–0.21**	0.07**	–0.03	0.01	E___
adventurous	**E**__**P**	–0.30**	0.24**	–0.08**	0.21**	EN_P
aggressive	__**T**_	–0.09**	0.07**	–0.20**	0.09**	__T_
alert	**E**___	–0.16**	–0.01	–0.05	–0.06*	E___
aloof	**I**_**T**_	0.19**	0.03	–0.14**	0.06*	I_T_
ambitious	**E**_**T**_	–0.23**	0.12**	–0.17**	0.08**	ENT_
anxious	**I**_**F**_	0.14**	–0.04	0.11**	–0.10**	I_FJ
apathetic	____	0.06*	0.02	0.01	0.08**	____
appreciative	__**F**_	–0.05*	–0.02	0.11**	–0.07**	__F_
argumentative	**E**_**T**_	–0.10**	0.12**	–0.15**	0.11**	ENTP
arrogant	__**T**_	–0.03	0.15**	–0.17**	0.11**	_NTP
artistic	_**N**__	–0.06*	0.23**	0.07**	0.02	_N__
assertive	**E**_**T**_	–0.25**	0.10**	–0.16**	–0.00	ENT_
awkward	____	0.06*	0.08**	–0.11**	0.12**	__TP
bright	_**N**__	–0.10**	0.10**	–0.05*	–0.03	EN__
calm	I___	–0.02	0.00	–0.05	0.01	____
careless	_**N**_**P**	0.00	0.09**	0.01	0.18**	___P
cautious	**IS**_**J**	0.15**	–0.16**	0.03	–0.19**	IS_J
changeable	_N_**P**	0.00	0.03	0.04	0.11**	___P
clumsy	_**N**_**P**	0.03	0.08**	0.10**	0.10**	__FP
cold	**I**_**T**_	0.20**	–0.01	–0.21**	0.05*	I_T_
complex	**IN**__	0.10**	0.17**	–0.11**	0.05	INT_
confident	**E**_**T**_	–0.31**	0.03	–0.16**	–0.02	E_T_
conforming	_**S**_**J**	0.08**	–0.26**	0.04	–0.20**	_S_J
conscientious	_S_**J**	0.00	–0.05	0.04	–0.16**	___J
conservative	_**S**_**J**	0.17**	–0.24**	–0.05*	–0.23**	IS_J
considerate	__**F**_	–0.10**	–0.04	0.14**	–0.06*	E_F_
conventional	_**S**_**J**	0.04	–0.34**	0.05*	–0.19**	_S_J
cooperative	__**F**_	–0.08**	–0.07**	0.12**	–0.03	__F_
creative	_**N**__	–0.13**	0.22**	–0.01	0.01	EN__
cultured	_**N**__	–0.11**	0.14**	–0.01	–0.05	EN__
curious	_N_P	–0.10**	0.11*	0.02	0.05*	E___
defensive	____	0.09**	–0.05*	–0.01	0.01	____
deliberate	_S_**J**	0.01	0.01	–0.17**	–0.10**	__TJ
dependable	_S_J	–0.04	–0.06*	0.05*	–0.06*	
determined	**E**__J	–0.11**	–0.01	–0.08**	–0.06*	E___
dissatisfied	_**N**__	0.12**	0.10**	0.07**	–0.08**	IN__
distractible	E**N**_**P**	0.03	0.11**	0.06*	0.16**	_N_P
distrustful	__**T**_	0.12**	0.07**	–0.12**	0.02	I_T_
down to earth	_**S**_J	–0.11**	–0.11**	0.06*	–0.02	ES__
easy-going	__**F**P	–0.13**	–0.10**	0.16**	0.06*	ESF_

[44] Reproduced from *European English MBTI Step I Manual Supplement* (1998) with kind permission of CPP Inc.

efficient	_STJ	–0.07**	–0.14**	–0.03	–0.19**	_S_J
egotistical	____	–0.08**	0.16**	–0.14**	–0.07**	_NT_
energetic	E___	–0.24**	0.04	–0.04	–0.03	E___
enthusiastic	EN__	–0.27**	0.03	0.06*	0.01	E___
even-tempered	__F_	0.00	–0.05	0.08**	–0.05	
fair-minded	__T_	–0.01	–0.03	0.04	–0.03	
fault finding	__T_	0.06*	–0.01	–0.22**	–0.01	__T_
fearless	E_T_	–0.14**	0.05*	–0.13**	0.08**	E_T_
fickle	____	0.05*	0.02	–0.01	0.05*	___
foresighted	_NT_	–0.02	0.05*	–0.11**	–0.10**	__TJ
forgiving	__F_	–0.07**	–0.02	0.18**	0.01	__F_
formal	_STJ	0.12**	–0.19**	–0.06*	–0.15**	IS_J
frivolous	EN_P	–0.16**	0.11**	0.04	0.12**	EN_P
fussy	_S_J	0.05*	–0.10**	–0.05*	–0.13**	_S_J
gentle	I_F_	0.07**	–0.01	0.22**	–0.03	__F_
gloomy	I___	0.24**	0.03	–0.07**	0.03	I___
hard	__T_	0.00	–0.02	–0.28**	0.02	__T_
hasty	E__P	–0.08**	0.07**	0.05*	0.15**	___P
headstrong	E_T_	–0.23**	0.09**	–0.07**	0.16**	E__P
imaginative	_N__	–0.16**	0.27**	0.03	0.07**	EN__
impatient	E_TP	–0.01	0.06*	–0.12**	0.08**	__T_
impulsive	EN_P	–0.19**	0.14**	0.11**	0.22**	ENFP
independent	I_T_	–0.06*	0.03	–0.12**	0.02	__T_
indifferent	____	0.07**	–0.01	–0.05*	0.11**	___P
individualistic	_NTP	–0.06*	0.23**	–0.09**	0.08**	_N__
industrious	_STJ	0.01	–0.04	–0.12**	–0.16**	__TJ
inhibited	I___	0.24**	–0.02	–0.01	–0.05*	I___
irritable	__T_	0.07**	0.04	–0.09**	0.05*	
shows initiative	E___	–0.19**	0.06**	–0.07**	0.01	E___
insightful	_N__	–0.10**	0.21**	–0.04	0.00	EN__
intelligent	____	–0.11**	0.10**	–0.09**	–0.07**	EN__
intellectual	_NT_	–0.07**	0.18**	–0.14**	–0.03	_NT_
has wide interests	EN_P	–0.22**	0.22**	–0.03	0.07**	EN__
irresponsible	____	0.01	0.09**	–0.01	0.17**	___P
kind	__F_	–0.03	–0.04	0.14**	–0.04	__F_
lax	____	0.09**	0.06*	0.01	0.18**	___P
lazy	____	0.07**	0.16**	–0.02	0.18**	_N_P
leisurely	___P	–0.04	–0.01	0.06**	0.15**	___P
liberal	_NF_	–0.06*	0.14**	0.04	0.05*	_N__
logical	__T_	–0.02	–0.09**	–0.13**	–0.11**	__TJ
mature	____	–0.01	–0.17**	–0.01	–0.15**	_S_J
mean	____	0.07**	0.00	–0.16**	0.00	__T_
meek	I_F_	0.22**	–0.10**	0.09**	–0.06*	IS__
methodical	_STJ	0.06*	–0.12**	–0.14**	–0.29**	_STJ
negligent	____	0.03	0.06*	–0.01	0.11**	___P
opinionated	E_T_	–0.13**	0.16**	–0.14**	0.08**	ENT_
optimistic	EN__	–0.16**	0.03	0.04	0.06*	E___
organised	_S_J	–0.08**	–0.18**	–0.05	–0.38**	_S_J
original	_N__	–0.14**	0.17**	–0.07**	0.09**	EN__

outgoing	**E___**	–0.50**	0.14**	0.02	0.13**	EN_P
outspoken	**E_T_**	–0.25**	0.14**	–0.16**	0.10**	ENTP
painstaking	**IS_J**	0.11**	–0.09**	–0.07**	–0.17**	I__J
passive	**I_F_**	0.15**	–0.12**	0.12**	–0.01	ISF_
patient	**IS**_J	0.04	–0.08**	0.15**	–0.06*	__F_
peaceable	**__F_**	0.10**	–0.08**	0.14**	–0.08**	I_F_
persevering	_S_**J**	0.00	0.00	–0.05	–0.10**	___J
persistent	**___J**	–0.09**	–0.01	–0.11**	–0.09**	__T_
plans things carefully	**___J**	–0.01	–0.14**	–0.04	–0.39**	_S_J
pleasure seeking	**E__P**	–0.28**	0.11**	0.07**	0.14**	EN_P
polished	**E___**	–0.12**	–0.04	–0.05	–0.13**	E__J
practical	**_S__**	–0.09**	–0.16**	0.01	–0.11**	_S_J
precise	**_STJ**	–0.01	–0.07**	–0.15**	–0.26**	__TJ
quiet	**I___**	0.49**	–0.17**	0.04	–0.11**	IS_J
gives up easily	____	0.04	–0.01	0.09**	0.09**	____
rational	____	–0.01	–0.03	–0.05	–0.13**	___J
scatterbrained	**_N_P**	0.02	0.07**	0.10**	0.17**	__FP
reasonable	**__T_**	–0.04	–0.07**	0.09**	–0.08**	____
rebellious	**_NTP**	–0.15**	0.26**	–0.08**	0.23**	EN_P
reckless	**E__P**	–0.10**	0.18**	0.01	0.22**	EN_P
reflective	I___	0.03	0.09**	0.00	–0.06*	____
relaxed	**___P**	–0.08**	0.00	0.02	0.09**	
reliable	**_S_J**	–0.02	–0.09**	0.05	–0.15**	___J
reserved	**I___**	0.44**	–0.16**	–0.01	–0.13**	IS_J
restless	**_N_P**	0.02	0.14**	–0.07**	0.12**	_N_P
retiring	**I___**	0.34**	–0.12**	0.03	–0.09**	IS__
rigid	__**T**J	0.11*	–0.03	–0.14**	–0.04	I_T_
ruthless	**__T_**	–0.05	0.08**	–0.20**	0.10**	__TP
secure	**_S_J**	–0.10*	–0.14**	–0.02	–0.13**	ES_J
self-centred	____	0.01	0.10**	–0.15**	0.04	_NT_
self-controlled	**___J**	–0.02	–0.05*	–0.10**	–0.10**	__TJ
self-denying	____	0.14**	–0.01	0.01	–0.07**	I___
self-sufficient	I_**T**_	–0.05	0.05*	–0.14**	0.02	__T_
selfish	____	0.07**	0.08**	–0.12**	0.09**	__T_
sensitive	**__F_**	–0.04	0.03	0.25**	0.00	__F_
serious	**I__J**	0.20**	–0.07**	–0.13**	–0.15**	I_TJ
sharp-witted	**_NT_**	–0.24**	0.15**	–0.10**	0.10**	ENTP
shiftless	____	0.04	0.06*	–0.06*	0.07**	____
shy	**I___**	0.43**	–0.09**	0.08**	–0.05	I___
simple	____	0.10**	–0.04	0.06*	0.00	I___
slipshod	____	0.07**	0.06*	0.01	0.16**	___P
sloppy	**___P**	0.08**	0.08**	0.00	0.15**	___P
slow	**I**S__	0.14**	0.00	0.03	0.01	I___
sociable	**E_F_**	–0.39**	0.01	0.11**	0.03	E_F_
spontaneous	**EN_P**	–0.32**	0.15**	0.04	0.17**	EN_P
stable	**_S_J**	–0.01	–0.13**	–0.03	–0.15**	_S_J
steady	**_S_J**	0.04	–0.21**	0.02	–0.18**	_S_J
strict	**__TJ**	0.06*	–0.17**	–0.17**	–0.19**	_STJ

submissive	____	0.12**	–0.03	0.07**	0.04	I___
suspicious	__**T**_	0.12**	0.00	–0.11**	–0.01	I_T_
sympathetic	__**F**_	–0.09**	–0.02	0.27**	–0.04	__F_
talkative	**E**___	–0.56**	0.10*	0.12**	0.08**	E_F_
thorough	_**S**_**J**	–0.05	–0.08**	–0.07**	–0.25**	___J
thoughtful	__**F**_	–0.07**	0.00	0.10**	–0.10**	__FJ
thoughtless	____	0.04	0.04	–0.06**	0.07**	____
timid	**I**_**F**_	0.31**	–0.08**	0.10**	–0.03	I_F_
tolerant	__**F**P	0.00	–0.07**	0.13**	–0.04	__F_
traditional	_**S**_**J**	0.10**	–0.36**	0.04	–0.27**	IS_J
unambitious	**I**_**F**_	0.22**	–0.12**	0.12**	–0.07**	ISF_
uncomplaining	____	0.15**	–0.10**	0.09**	–0.01	IS__
unconventional	_**N**_**P**	–0.02	0.31**	–0.08**	0.18**	_N_P
undependable	____	0.01	0.03	–0.03	0.04	____
understanding	__**F**_	–0.03	–0.03	0.16**	–0.06*	__F_
unemotional	__**T**_	0.17**	0.01	–0.25**	0.01	I_T_
unforgiving	__**T**_	0.06**	0.01	–0.13**	0.05	__T_
uninhibited	**E**___	–0.18**	0.15**	–0.05	0.11**	EN_P
uninquisitive	____	0.06*	–0.06**	–0.02	0.03	____
unkind	____	0.04	0.00	–0.08**	0.02	____
unscrupulous	____	–0.01	0.04	–0.02	0.07**	____
unworried	___**P**	–0.05	0.07**	–0.12**	0.09**	__T_
weak-willed	____	0.13**	0.02	0.06*	0.06*	I___
withdrawn	**I**___	0.36**	0.00	–0.04	–0.02	I___
witty	**EN**_**P**	–0.26**	0.14**	–0.03	0.13**	EN_P

Appendix 3: Brief summary of what the 16PF instrument measures

The 16PF instrument is a robust measure of personality traits. It was developed by Raymond Cattell in 1949 and is available in European English and many other languages. The current fifth edition is one of the most validated predictors of human behaviour and is based on over 50 years of research and testing.

The questionnaire assesses an individual's personality against the following 16 Primary Factors:

16PF Primary Factor	Description
A Warmth	Your desire to develop close relationships with others
B Reasoning	The extent to which you can solve numerical and verbal problems
C Emotional Stability	How calmly you respond to life's demands
E Dominance	Your tendency to assert influence and/or control others
F Liveliness	How freely and spontaneously you express yourself
G Rule-Consciousness	How much value you place on externally imposed rules
H Social Boldness	How comfortable you feel in social situations
I Sensitivity	The extent to which emotions and sentiments influence your outlook and judgment
L Vigilance	The extent to which you are cautious of others' motives
M Abstractedness	How much attention you give to abstract rather than concrete observations
N Privateness	How much you like to keep personal information to yourself
O Apprehension	How prone you are to self-criticism
Q1 Openness to Change	The extent to which you enjoy new situations and experiences
Q2 Self-Reliance	How much you enjoy your own company and trust your own judgment
Q3 Perfectionism	Whether you need to rely on structure rather than leaving things to chance
Q4 Tension	How easily situations can cause you frustration

Each of the Primary Factors also contributes to one or more of the five Global Factors. These are:

16PF Global Factor	Description
Extraversion	This is about the extent to which an individual wants to be with or around other people, as opposed to spending time on their own, and the amount of energy they will invest in initiating and maintaining social relationships
Independence	This refers to an individual's style of self-expression and persuasion, and the extent to which they will want to go their own way/take charge of situations as opposed to cooperating and collaborating
Tough-Mindedness	This is about the extent to which an individual will experience the world in concrete, logical, unsentimental terms as opposed to paying attention to emotions, intuition and other, more subjective aspects
Self-Control	This is about how an individual structures and orders their life, the extent to which they control their impulses, their level of self-discipline, and therefore how predictable their behaviour is
Anxiety	This refers to the way that an individual manages the pressures and stresses in their life. It may refer to their general state of mind or reflect what is going on in their life at the time

MBTI® Step I instrument

European Data Supplement

Danish

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Contents

Introduction

Data from three different samples were analysed to produce the findings in this chapter. A brief description of each sample is given below. Further details of the samples are provided in Appendix 1.

- A sample of 13,561 individuals who completed the MBTI Step I questionnaire in Danish via the OPPassessment system between 2004 and mid-2008.[1] This sample is considered to be representative of the groups of people with whom the Danish MBTI instrument has been and will be used for applications such as management development, coaching, counselling and teambuilding. As such, it is likely to represent a cross-section of the Danish-speaking professional and managerial population.
- A group of 221 MBTI practitioners who took part in a research study to look at the relationship between MBTI reported type and best-fit type.
- A group of 183 employees from a media organisation, who took part in a best-fit research study.

The results of the analyses are outlined below.

[1] OPPassessment allows personality questionnaires such as the MBTI instrument to be administered via email and/or completed online.

Type distribution

Type tables are a way of illustrating the proportion of each type within a particular group. Below are type tables for the three Danish samples described above.

For each of the 16 different types, the number of cases, the percentage of the total that this represents and the self-selection ratio (SSR) are shown. The SSR (Myers et al., 1998) is a way of demonstrating whether a given type appears more or less often in a particular group than would be expected given its frequency in a reference group. An SSR of greater than 1 indicates that a type is over-represented, and an SSR of less than 1 denotes that it is under-represented. Asterisks are used to denote whether the over- or under-representations are statistically significant, based on the results of chi-square analysis.[2]

Ideally, the type distribution from a large representative sample of the Danish population would be used to calculate SSRs in this data supplement. However, such a sample does not currently exist. In its place, SSRs have been calculated using type data from the UK general population (Kendall, 1998), which can be justified by the fact that type distributions for comparable Danish and British groups, such as managers and professionals, are similar. Evidence (eg Hackston and Kendall, 2004; Quenk et al., 2004; Kirby, Kendall and Barger, 2007) does suggest that although type-related behaviours vary a good deal from country to country and from culture to culture, the frequencies of underlying MBTI types do not.

[2] Chi-square analysis (often abbreviated to χ^2) is a technique used to explore whether observed frequency distributions differ significantly from other, predefined, distributions. In this case, the UK general population group is used as the reference group, and the chi-square analysis indicates whether the proportion of people of each type within a particular sample differs significantly from the proportion of people reporting the same type within the reference group.

OPPassessment data (representative Danish-speaking professional and managerial sample)

Table 3.1: Type table for OPPassessment data (reported type, n=13,561)

ISTJ	ISFJ	INFJ	INTJ
n=1,455 10.7% SSR=0.78**	n=367 2.7% SSR=0.21**	n=83 0.6% SSR=0.36**	n=369 2.7% SSR=1.93**
ISTP	**ISFP**	**INFP**	**INTP**
n=457 3.4% SSR=0.52**	n=109 0.8% SSR=0.13**	n=155 1.1% SSR=0.36**	n=440 3.2% SSR=1.33
ESTP	**ESFP**	**ENFP**	**ENTP**
n=1,072 7.9% SSR=1.36**	n=333 2.5% SSR=0.28**	n=827 6.1% SSR=0.97	n=1,750 12.9% SSR=4.69**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=3,073 22.7% SSR=2.18**	n=951 7.0% SSR=0.56**	n=499 3.7% SSR=1.34	n=1,621 12.0% SSR=4.07**

Type	n	%
E	10,126	74.7%**
I	3,435	25.3%**
S	7,817	57.6%**
N	5,744	42.4%**
T	10,237	75.5%**
F	3,324	24.5%**
J	8,418	62.1%**
P	5,143	37.9%**

*Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

The most common single type preference is ESTJ (23% of the total); this is a common finding with managerial groups in other countries. The SSR results suggest that, in comparison with the UK general population, those with preferences for NT are over-represented and those with preferences for SF are under-represented. Again, this is a common finding with managerial groups.

MBTI practitioners

Table 3.2: Type table for MBTI practitioners

Reported type (n=221)

ISTJ	ISFJ	INFJ	INTJ
n=13 5.9% SSR=0.43**	n=3 1.4% SSR=0.11**	n=4 1.8% SSR=1.06	n=18 8.1% SSR=5.79**
ISTP	**ISFP**	**INFP**	**INTP**
n=6 2.7% SSR=0.42*	n=0 0.0% SSR=0.00**	n=9 4.1% SSR=1.28	n=12 5.4% SSR=2.22*
ESTP	**ESFP**	**ENFP**	**ENTP**
n=7 3.2% SSR=0.54	n=10 4.5% SSR=0.52*	n=40 18.1% SSR=2.87**	n=56 25.3% SSR=9.20**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=15 6.8% SSR=0.65	n=5 2.3% SSR=0.18**	n=12 5.4% SSR=1.97*	n=11 5.0% SSR=1.69

Type	n	%
E	156	70.6%**
I	65	29.4%**
S	59	26.7%**
N	162	73.3%**
T	138	62.4%**
F	83	37.6%**
J	81	36.7%**
P	140	63.3%**

Best-fit type (n=221)

ISTJ	ISFJ	INFJ	INTJ
n=5 2.3% SSR=0.17**	n=4 1.8% SSR=0.14**	n=6 2.7% SSR=1.58	n=13 5.9% SSR=4.18**
ISTP	**ISFP**	**INFP**	**INTP**
n=4 1.8% SSR=0.28**	n=1 0.5% SSR=0.07**	n=13 5.9% SSR=1.85*	n=12 5.4% SSR=2.22*
ESTP	**ESFP**	**ENFP**	**ENTP**
n=8 3.6% SSR=0.62	n=13 5.9% SSR=0.68	n=50 22.6% SSR=3.59**	n=41 18.6% SSR=6.74**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=13 5.9% SSR=0.57*	n=11 5.0% SSR=0.39**	n=11 5.0% SSR=1.81	n=16 7.2% SSR=2.46**

Type	n	%
E	163	73.8%**
I	58	26.2%**
S	59	26.7%**
N	162	73.3%**
T	112	50.7%
F	109	49.3%
J	79	35.7%**
P	142	64.3%**

For both tables above: *Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

Looking at reported type, the most frequent type preferences are clearly ENTP (25% of the total), followed by ENFP (18%). Overall, the group tends to have a preference for Intuition and Extraversion, and to a lesser extent for Perceiving and Thinking.

In terms of best-fit type, ENFP (23%) is the most frequently occurring type preference, followed by ENTP (19%). The general pattern is very similar to that found with reported type, with the group tending to have a preference for Extraversion and Intuition, and to a lesser extent for Perceiving and Thinking. A notable difference, however, is that the proportion of Thinking types is considerably higher when we look at reported type than when we look at best-fit type (62% vs 51%).

It is known that people often feel pressure to exhibit more of a Thinking style of behaviour in business settings. This may help to explain why we find a lower proportion of Thinking types when we look at best-fit type than when we look at reported type.

Media organisation employees

Table 3.3: Type table for media organisation employees

Reported type (n=183)

ISTJ	ISFJ	INFJ	INTJ
n=8 4.4% SSR=0.32**	n=2 1.1% SSR=0.09**	n=3 1.6% SSR=0.96	n=5 2.7% SSR=1.94
ISTP	**ISFP**	**INFP**	**INTP**
n=8 4.4% SSR=0.68	n=2 1.1% SSR=0.18**	n=2 1.1% SSR=0.34	n=5 2.7% SSR=1.12
ESTP	**ESFP**	**ENFP**	**ENTP**
n=11 6.0% SSR=1.03	n=2 1.1% SSR=0.13**	n=30 16.4% SSR=2.60**	n=32 17.5% SSR=6.35**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=23 12.6% SSR=1.21	n=12 6.6% SSR=0.52*	n=13 7.1% SSR=2.58**	n=25 13.7% SSR=4.65**

Type	n	%
E	148	80.9%**
I	35	19.1%**
S	68	37.2%**
N	115	62.8%**
T	117	63.9%**
F	66	36.1%**
J	91	49.7%*
P	92	50.3%*

Best-fit type (n=183)

ISTJ	ISFJ	INFJ	INTJ
n=13 7.1% SSR=0.52*	n=4 2.2% SSR=0.17**	n=6 3.3% SSR=1.91	n=4 2.2% SSR=1.55
ISTP	**ISFP**	**INFP**	**INTP**
n=7 3.8% SSR=0.60	n=2 1.1% SSR=0.18**	n=4 2.2% SSR=0.69	n=6 3.3% SSR=1.34
ESTP	**ESFP**	**ENFP**	**ENTP**
n=4 2.2% SSR=0.38*	n=4 2.2% SSR=0.25**	n=36 19.7% SSR=3.12**	n=30 16.4% SSR=5.95**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=18 9.8% SSR=0.95	n=13 7.1% SSR=0.56*	n=13 7.1% SSR=2.58**	n=19 10.4% SSR=3.53**

Type	n	%
E	137	74.9%**
I	46	25.1%**
S	65	35.5%**
N	118	64.5%**
T	101	55.2%*
F	82	44.8%*
J	90	49.2%*
P	93	50.8%*

For both tables above: *Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

Looking at reported type, the most frequent type preferences are ENTP (18% of the total), followed by ENFP (16%). Overall, the group tends to have a very clear preference for Extraversion, and to a lesser extent for Thinking and Intuition. There is an approximately even distribution of people with preferences for Judging and Perceiving.

In terms of best-fit type, ENFP (20%) is also the most frequently occurring type preference, followed by ENTP (16%). The general pattern is very similar to that found with reported type, with the group tending to have a clear preference for Extraversion, and to a lesser extent for Intuition and Thinking. A notable difference, however, is that the proportion of Thinking types is considerably higher when we look at reported type than when we look at best-fit type (64% vs 55%).

This is the same as was found with the other group for whom best-fit data were available, adding support to the suggestion that people often feel pressure to exhibit more of a Thinking style of behaviour in business settings.

Internal consistency reliability

The reliability of a test or questionnaire relates to how consistent and precise it is. Internal consistency reliability addresses the question of whether all the questions in a scale measure the same construct. A common measure of internal consistency reliability is coefficient alpha (Cronbach, 1951). The alpha coefficients for the Danish OPPassessment sample are shown in Table 3.4.

Table 3.4: Internal consistency reliability

Dimension	Coefficient alpha
E–I	0.84
S–N	0.82
T–F	0.74
J–P	0.81

It is generally agreed that internal consistency reliability should achieve a value of at least 0.7 for a test to be considered to be reliable.[3] On this basis, all of the dimensions of the questionnaire show good reliability. In addition, the alpha coefficients have been found to be consistent across different age groups and across males and females.

[3] For example, see Nunnally (1978) or Kline (2000).

Intercorrelations between MBTI dimensions

One of the original aims of developing the MBTI questionnaire was to see if dimensions could be produced that were independent of each other. Results from other language versions have shown that this was achieved with all dimensions except Sensing–Intuition and Judging–Perceiving. This shows up despite the fact that questions were carefully chosen to sort on only one dimension. The author of the questionnaire hypothesised that the S–N/J–P relationship may simply be a reflection of reality rather than a failing in the construction of the questionnaire.

The intercorrelations between dimensions amongst the Danish OPPassessment sample are shown in Table 3.5. In order to be able to calculate the correlations, scores on each dimension were converted to continuous scores.[4]

Table 3.5: Intercorrelations between dimensions

	E–I	S–N	T–F	J–P
E–I		–0.22**	–0.14**	–0.10
S–N			0.12**	0.46**
T–F				0.10**
J-P				

**Significant at p<0.01.

Although statistically significant, only very low correlations were found between most of the dimensions. The S–N/J–P relationship that has been found with other language versions has been replicated, showing that a preference for Sensing is likely to be associated with a preference for Judging, and that a preference for Intuition is likely to be associated with a preference for Perceiving.

[4] Continuous scores (Myers and McCaulley, 1985, p. 9) place an individual's score on each dimension onto a continuous scale with a mid-point of 100. To calculate continuous scores, Preference Clarity Index (PCI) scores for each dimension are either subtracted or added to 100, depending on which direction the overall preference is. PCI scores in the direction of E, S, T or J are subtracted from 100. PCI scores in the direction of I, N, F or P are added to 100.

Best-fit validity: the accuracy of the Danish MBTI Step I instrument in predicting best-fit type

The purpose of the MBTI instrument is to help individuals to establish their validated or 'best-fit' psychological type. A key measure of the validity of the instrument is, therefore, how well the results relate to best-fit (validated) type. These data are useful to practitioners in knowing how typically accurate the reported result is likely to be.

Best-fit data are available for two samples; a sample of MBTI practitioners who took part in a research study to look at the relationship between MBTI reported type and best-fit type, and a sample of employees working in a media organisation (half of whom were journalists).

Table 3.6 presents the results of the analysis comparing best-fit with reported type. The Danish questionnaire performs in a similar way to other language versions for which best-fit data are available, and there is very good evidence for the accuracy of the instrument. In around two-thirds of cases, a respondent's reported type will match their best-fit type, and in well over 90% of cases at least three of the four preferences will match.

Table 3.6: Match of reported and best-fit type

	Danish MBTI practitioners (n=221)		Media organisation employees (n=183)	
Agrees with four letters	56.1%	91.8%	71.0%	95.6%
Agrees with three letters	35.7%		24.6%	
Agrees with two letters	6.8%	8.2%	3.8%	4.4%
Agrees with one letter	0.9%		0.5%	
Agrees with no letters	0.5%		0.0%	

Dimension	Percentage agreement	
	Danish MBTI practitioners (n=221)	Media organisation employees (n=183)
E–I	91.4%	93.4%
S–N	90.0%	87.4%
T–F	75.6%	90.2%
J–P	89.1%	95.1%

Further analysis was carried out to investigate the validity and accuracy of the questionnaire. MBTI qualifying training course delegates and MBTI practitioners were asked how confident they felt about their results on each type dichotomy (on a scale from 1 to 5, where 5 indicated the highest degree of confidence). For every dimension except T–F, approximately two-thirds of the group were

confident about their type. For the T–F dimension the figure was approximately 10% lower. This corresponds with the findings of the best-fit research, where a high level of agreement was found between reported and best-fit preferences for each of the four dimensions, but with the T–F dimension being lower than the other three. All these figures provide further support for the validity of the MBTI approach. Detailed results are shown in Table 3.7.

Table 3.7: Degree of confidence in results

Degree of confidence	Percentage of group			
	E–I	S–N	T–F	J–P
5 (highest)	41%	41%	26%	43%
4	23%	25%	30%	22%
3	10%	13%	21%	15%
2	14%	11%	14%	9%
1 (lowest)	13%	10%	10%	9%
% at 4 or above	*64%*	*66%*	*56%*	*65%*

In summary, there is good evidence for the validity of the Danish MBTI Step I instrument. Specifically:

- There is a high level of agreement between best-fit and reported type, comparable with results for other European language versions.
- Respondents are confident about their results.

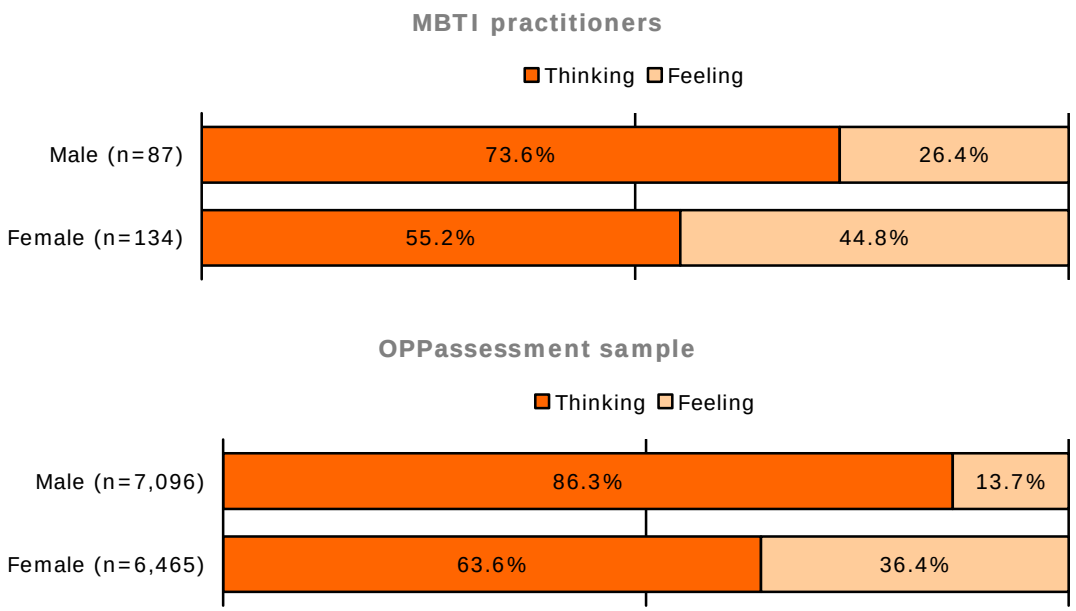
Group differences in type

Across the two samples for which reported type data were available, various types of demographic information were collected. The relationship of MBTI type to each of these factors is described below.

Gender

Most groups who take the MBTI questionnaire show a significant gender difference on the Thinking–Feeling dimension, and this is the case for both of the groups in this study, as shown in Figure 3.1.[5]

Figure 3.1: Gender differences on the T–F dimension



When compared with the T–F distribution in the combined sample, Thinking preferences are over-represented amongst men and Feeling preferences are over-represented amongst women (although even amongst females in these groups there are more individuals with a preference for Thinking than for Feeling). This effect has been found many times with many different versions of the instrument in a number of different cultures.

Age

Previous research using UK Step I continuous scores has shown significant correlations between age and three of the four dimensions

[5] MBTI practitioners: $\chi^2=7.57$; significant at $p<0.01$. OPPassessment sample: $\chi^2=945.56$; significant at $p<0.001$.

(Warr, Miles and Platts, 2001). Older people were more likely than younger people to have preferences for Introversion, Sensing and Judging.

The data in this supplement were analysed in a slightly different way, by looking for differences in average age between people with preferences for Extraversion versus those with preferences for Introversion, for Sensing versus Intuition, for Thinking versus Feeling and for Judging versus Perceiving. The OPPassessment sample showed statistically significant relationships between age and two of the dimensions,[6] as shown on Table 3.8. The mean age of people with a preference for Introversion was approximately one and a half years higher than of those with a preference for Extraversion. The mean age of those with a preference for Intuition was just under half a year higher than of those with a preference for Sensing. Although statistically significant, the differences are still small in real terms.

Table 3.8: Significant mean age differences

	Extraversion	Introversion	Difference	Significance
Mean age (years)	40.42	41.84	1.42	***

	Sensing	Intuition	Difference	Significance
Mean age (years)	40.60	40.99	0.39	*

Difference significant at: *p<0.05, **p<0.01, ***p<0.001.

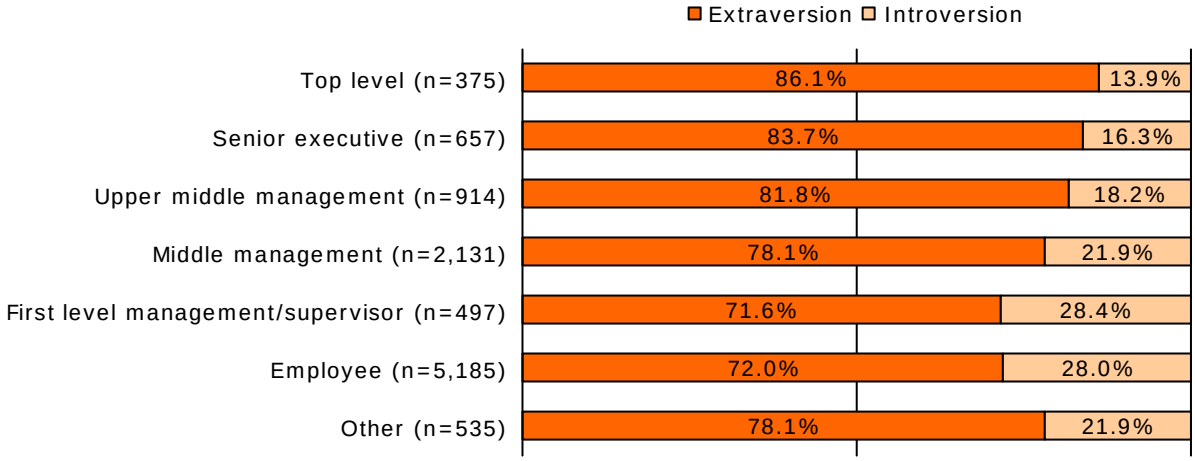
Occupational level

Previous research in other countries has demonstrated that individuals in higher level jobs in organisations are more likely to have preferences for Intuition and for Thinking than those in lower level jobs (Quenk, Hammer and Majors, 2004). This is reflected in the relationship of the Sensing–Intuition and Thinking–Feeling dimensions with occupational level in the OPPassessment sample. A relationship was also found with the Extraversion–Introversion and Judging–Perceiving dimensions.

The data suggest that individuals at the top level are most likely to have a preference for Extraversion, and the proportion of individuals with Extraversion preferences decreases steadily with occupational level down to first-level management and employees, who are similar, as shown in Figure 3.2.

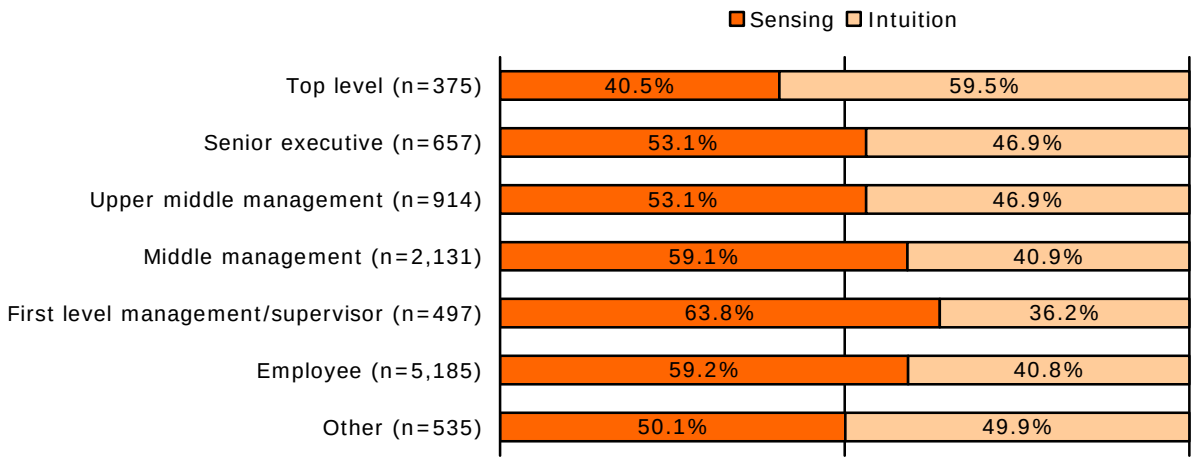
[6] Independent-samples t-tests: EI significant at p<0.001, SN significant at p<0.05.

Figure 3.2: Extraversion–Introversion[7] and occupational level (OPPassessment data)



The data also suggest that individuals at the top level are most likely to have a preference for Intuition, followed by senior executives and those in upper middle management. The proportions of people with preferences for Intuition were lowest amongst those from middle management down to employee level, as shown in Figure 3.3.

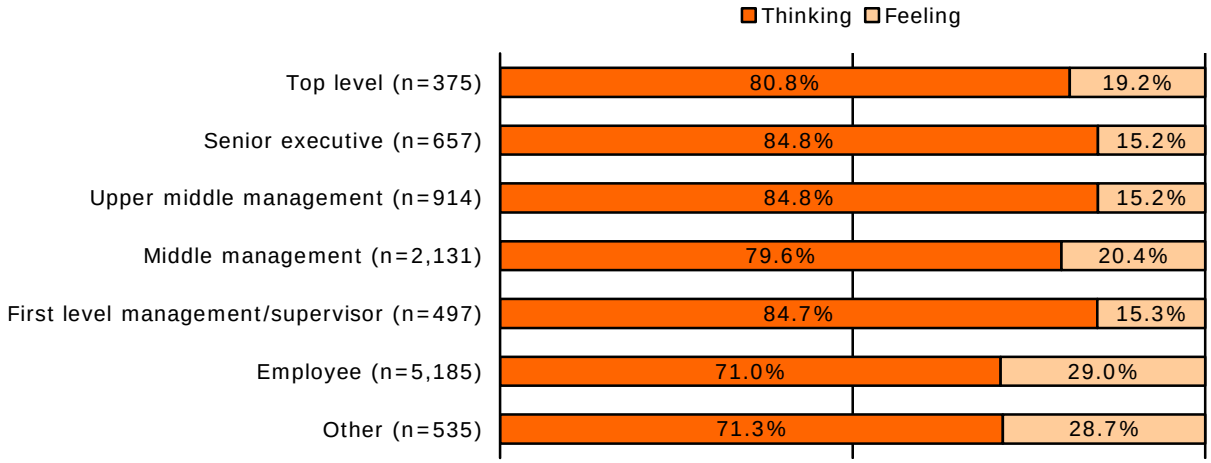
Figure 3.3: Sensing–Intuition[8] and occupational level (OPPassessment data)



It was also found that those with a preference for Thinking are slightly under-represented at employee level, as shown in Figure 3.4. All other occupational levels contained a similar (higher) proportion of Thinking types.

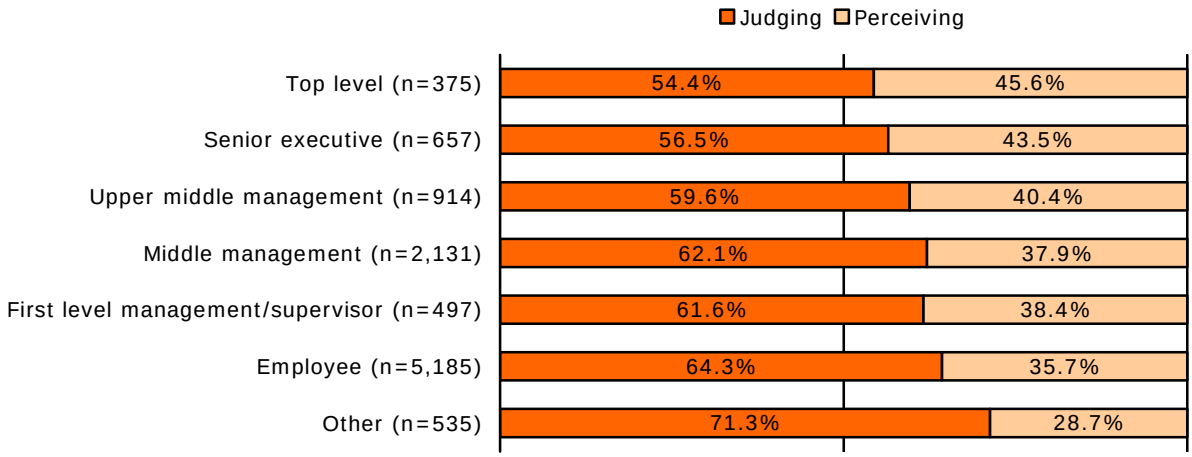
[7] $\chi^2=115.66$; significant at $p<0.001$.
[8] $\chi^2=84.87$; significant at $p<0.001$.

Figure 3.4: Thinking–Feeling[9] and occupational level (OPPassessment data)



Finally, the data shown in Figure 3.5 suggest that the proportion of individuals with a preference for Perceiving decreases in line with occupational level.

Figure 3.5: Judging-Perceiving[10] and occupational level (OPPassessment data)



Note also that in this data set as a whole, preferences for Extraversion, Intuition and Thinking are over-represented in comparison with the general UK population.

[9] $\chi^2=178.91$; significant at $p<0.001$.
[10] $\chi^2=34.62$; significant at $p<0.001$.

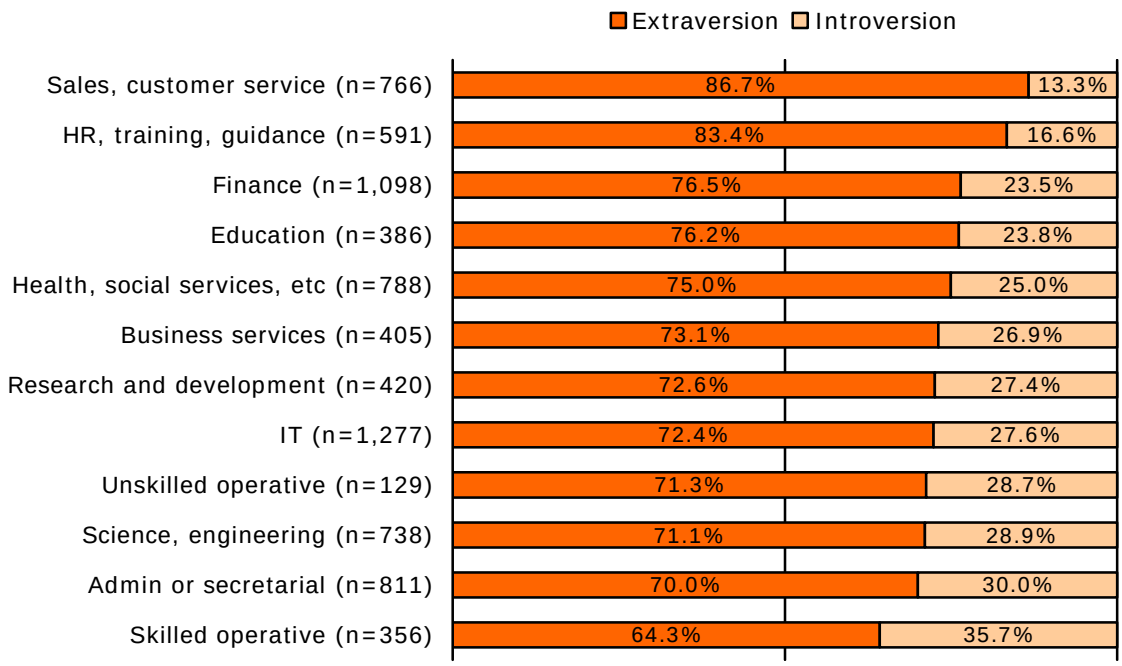
Education

Specific educational qualifications were not available for the OPPassessment sample; however, the age at which individuals left full-time education was. There was found to be a link between two of the dimensions and the age at which individuals left full-time education. On average, those with a preference for Intuition left education approximately two years later than those with a preference for Sensing. Those with a preference for Perceiving left education on average approximately half a year later than those with a preference for Judging.

Work area

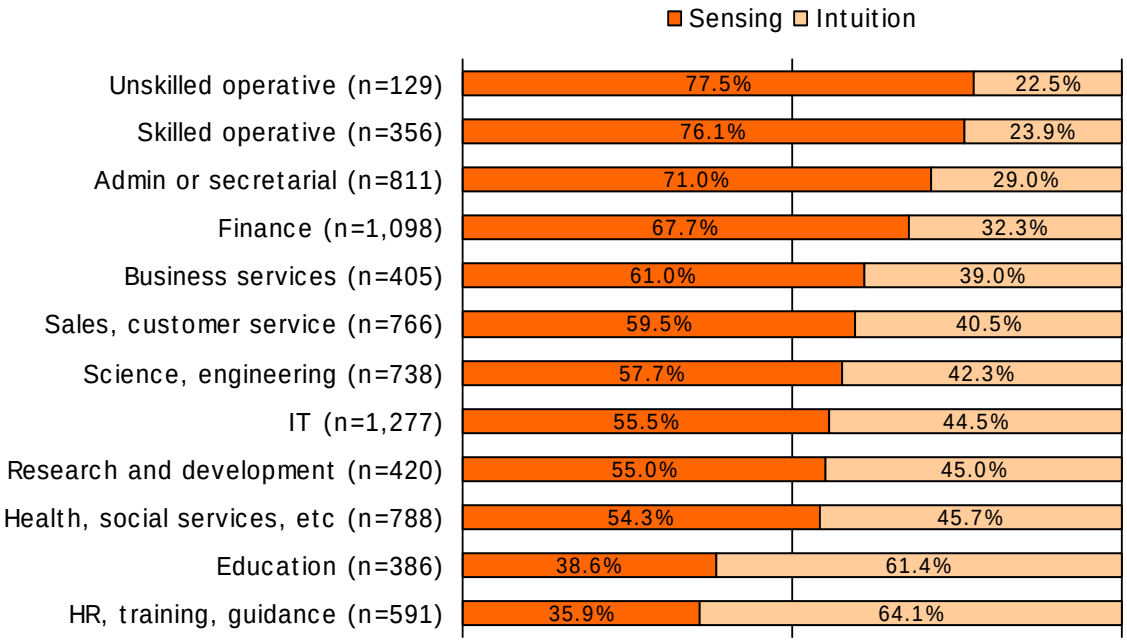
Previous research suggests that an individual's MBTI type influences their choice of career (Hammer, 1998), and indeed there is a statistically significant relationship between each dimension and work area. In the figures that follow, categories have been re-ordered according to the percentage of E, S, T or J, and work areas with fewer than 100 respondents have been omitted (as well as undefined work areas such as 'Other').

Figure 3.6: Extraversion–Introversion[11] and work area



[11] χ^2=139.24; significant at p<0.001.

Figure 3.7: Sensing–Intuition[12] and work area



[12] χ^2=400.92; significant at p<0.001.

Figure 3.8: Thinking–Feeling[13] and work area

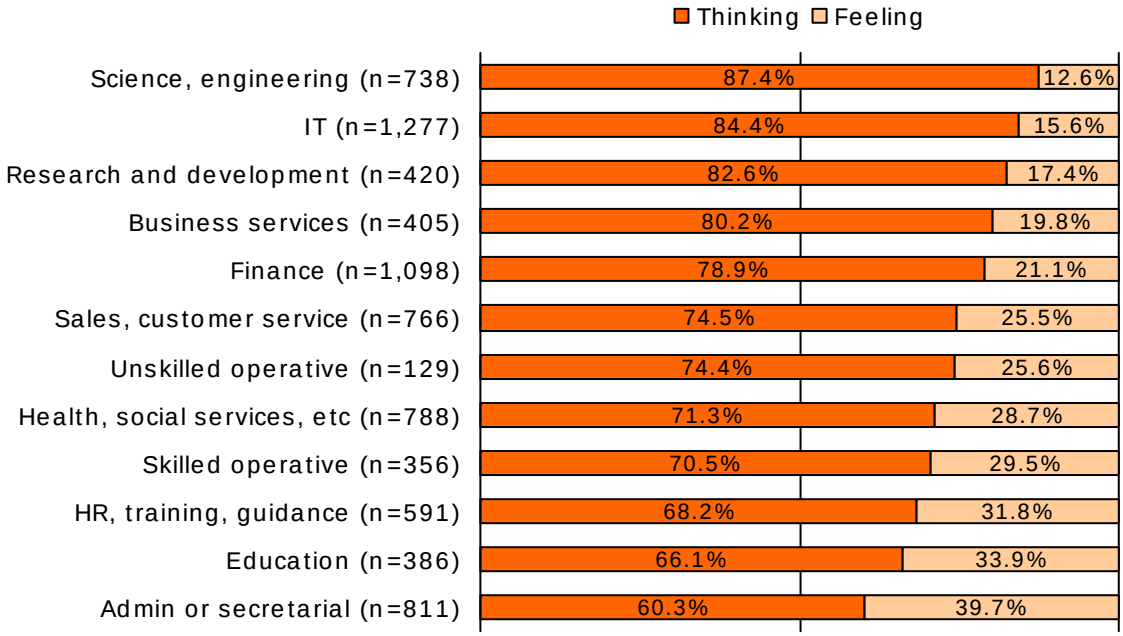
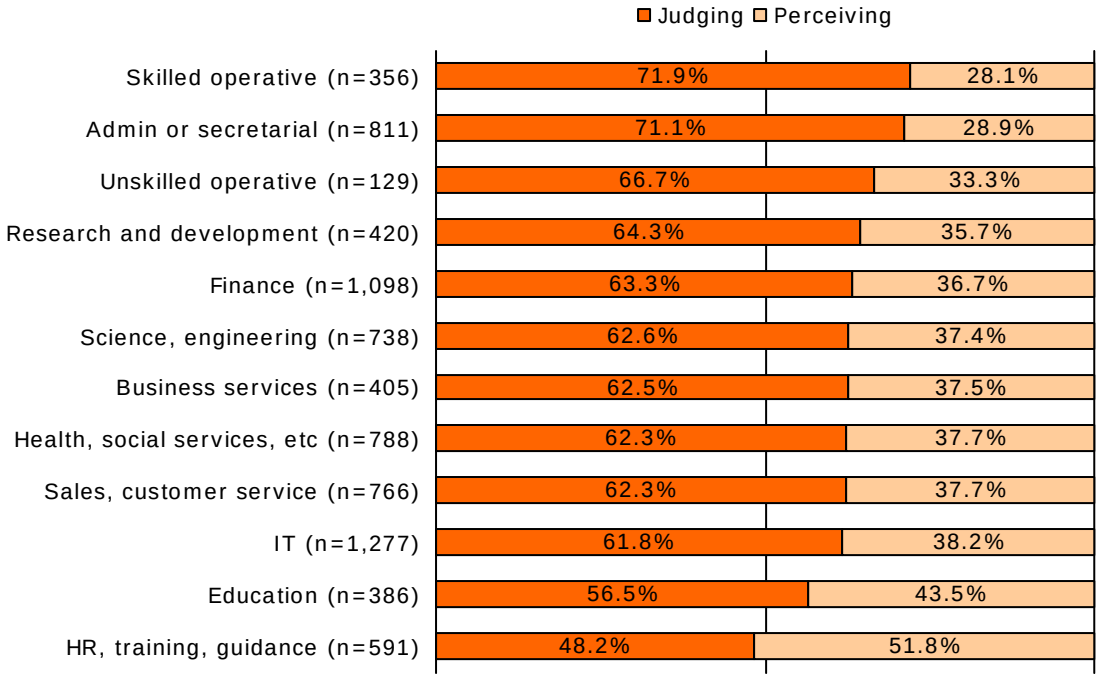


Figure 3.9: Judging–Perceiving[14] and work area



[13] χ^2=297.81; significant at p<0.001.
[14] χ^2=104.39; significant at p<0.001.

Nationality

Information on nationality was available for the OPPassessment group. Of the sample, 97% were Danish; other nationalities included Swedish, Norwegian and German. However, no other nationality was represented in sufficiently large numbers for an analysis of type differences by nationality to be conducted.

Employment status

Employment status was available for the OPPassessment sample, and showed a relationship with the Sensing–Intuition, Thinking–Feeling and Judging-Perceiving dimensions. Those who were self-employed were more likely than other groups to have a preference for Intuition,[15] whereas those who worked part-time were more likely than other groups to have a preference for Feeling.[16] This is likely to be a gender effect; 86% of part-time workers were female, compared with 46% of the total group and 44% of full-time workers. In addition, those who worked part-time were more likely to have a preference for Judging than those who worked full-time who were, in turn, more likely to have a preference for Judging than those who were self-employed.[17]

Appendix 1: Sample descriptions

Sample 1: Data from OPPassessment (representative Danish-speaking professional and managerial sample)

This sample consists of 13,561 individuals who completed the MBTI Step I questionnaire in Danish via the OPPassessment system between January 2004 and June 2008. Of these respondents, 52% were male and 48% were female. Age ranged from 16 to 74 years, with a mean of 41 and a median of 40.

Nationality was disclosed by 84% of respondents. Of these, 97% were Danish. No other individual nationality was represented in large numbers.

Nationality	Percentage
Danish	96.5%
Other	3.5%

[15] χ^2=29.82; significant at $p<0.001$.
[16] χ^2=141.88; significant at $p<0.001$.
[17] χ^2=21.92; significant at $p<0.001$.

The majority of the group were in full-time employment:

Employment status	Percentage
Full-time	91.5%
Part-time	5.8%
Self-employed	2.1%
Unemployed	0.5%
Retired	0.1%
Homemaker	<0.1%

Many of the group were of managerial level or above, although the largest single group was employee level (50.4%):

Occupational level	Percentage
Top level	3.6%
Senior executive	6.4%
Upper middle management	8.9%
Middle management	20.7%
First-level management/supervisor	4.8%
Employee	50.4%
Other	5.2%

A range of work areas were represented:

Work area (job type)	Percentage
IT	12.4%
Finance	10.7%
Admin or secretarial	7.9%
Health, social services, etc.	7.7%
Sales, customer service	7.4%
Science, engineering	7.2%
HR, training, guidance	5.7%
Research and development	4.1%
Business services	3.9%
Education	3.8%
Skilled operative	3.5%
Unskilled operative	1.3%
Land, sea or air transport	0.4%
Military, police, prison, fire	0.3%
Leisure, personal service	0.3%
Other private sector	9.1%
Other public sector	8.5%
Other	6.0%

Sample 2: MBTI practitioners

This sample consisted of 221 MBTI practitioners who took part in a research study to look at the relationship between MBTI reported type and best-fit type.

Of this group, 134 (61%) were female and 87 (39%) were male. Age ranged from 25 to 67 years, with a mean of 44. The majority of respondents did not disclose their nationality (138 individuals, or 62%). However, of those who did, all were Danish (83 individuals, or 38%).

In total, 142 respondents (64%) did not disclose their employment status. Of those who did, 61 (28%) described themselves as working full-time and four (2%) as working part-time. Thirteen individuals (6%) described their employment status as self-employed, and one person (0.5%) was unemployed.

Of this sample group, 141 (67%) did not disclose their job level. Thirty (14%) were at employee level, with one (0.5%) at first-level management or supervisory level, 22 (10%) at middle management level and ten (5%) at top or senior executive level. The most common job types amongst the group were ‘HR, training, guidance’ (44 individuals, or 20%), ‘Health, social services’ (11 individuals, or 5%) and ‘Education’ (eight individuals, or 4%).

Sample 3: Media organisation employees

This sample consisted of 183 employees from a media organisation who took part in a research study to look at the relationship between MBTI reported type and best-fit type.

Of this group, 109 (60%) were female and 73 (40%) were male. The gender of one person was unrecorded. In terms of roles, 92 (50%) were journalists and 32 (17%) were editors or chief editors. A variety of other roles were represented, but each in relatively small numbers.

MBTI® Step I instrument

European Data Supplement

Dutch

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Contents

Introduction

Data from six different samples were analysed to produce the findings in this chapter. A brief description of each sample is given below. Further details of the samples are provided in Appendix 1.

- A group of 13,430 individuals who completed the MBTI Step I questionnaire in Dutch via the OPPassessment system between 2004 and mid-2008.[1] This sample is considered to be representative of the groups of people with whom the Dutch MBTI instrument has been and will be used for applications such as management development, coaching, counselling and teambuilding. As such, it is likely to represent a cross-section of the Dutch-speaking professional and managerial population.

- A sample of 214 individuals who completed a trial version of the MBTI questionnaire as part of the development of the MBTI Step II instrument. This sample was designed to be representative of the Dutch general population.

- A group of 392 Dutch participants on management development programmes at Ashridge Business School, run between 2000 and 2003.[2]

- A group of 197 delegates on MBTI qualifying training courses held in The Netherlands between 2004 and 2007.

- A sample of 199 MBTI practitioners who took part in a research study to look at the relationship between MBTI reported type and best-fit type.

- A sample of 95 MBTI practitioners who took part in a research study to look at the relationship between MBTI best-fit type and a well-known trait-based personality instrument (the 16PF® questionnaire).

The results of the analyses are outlined below.

[1] OPPassessment allows personality questionnaires such as the MBTI instrument to be administered via email and/or completed online.
[2] Data reproduced with kind permission from Ashridge Business School.

Type distribution

Type tables are a way of illustrating the proportion of each type within a particular group. Below are type tables for five of the six Dutch samples described above.[3]

For each of the 16 different types, the number of cases, the percentage of the total that this represents and the self-selection ratio (SSR) are shown. The SSR (Myers et al., 1998) is a way of demonstrating whether a given type appears more or less often in a particular group than would be expected given its frequency in a reference group. An SSR of greater than 1 indicates that a type is over-represented, and an SSR of less than 1 denotes that it is under-represented. Asterisks are used to denote whether the over- or under-representations are statistically significant, based on the results of chi-square analysis.[4]

Ideally, the type distribution from a large representative sample of the Dutch population would be used to calculate SSRs in this data supplement. However, such a sample does not currently exist; the closest sample that we do have to a Dutch population is too small for us to have full confidence that the type distribution is representative. Instead, SSRs have been calculated using type data from the UK general population (Kendall, 1998), which can be justified by the fact that type distributions for comparable Dutch and British groups, such as managers and professionals, are similar. Evidence (eg Hackston and Kendall, 2004; Quenk et al., 2004; Kirby, Kendall and Barger, 2007) does suggest that although type-related behaviours vary a good deal from country to country and from culture to culture, the frequencies of underlying MBTI types do not.

[3] The type distribution of the 95 MBTI practitioners who took part in a research study to look at the relationship between MBTI best-fit type and the 16PF®5 questionnaire is shown separately later in this chapter.

[4] Chi-square analysis (often abbreviated to χ^2) is a technique used to explore whether observed frequency distributions differ significantly from other, predefined, distributions. In this case, the UK general population group is used as the reference group, and the chi-square analysis indicates whether the proportion of people of each type within a particular sample differs significantly from the proportion of people reporting the same type within the reference group.

OPPassessment data (representative Dutch-speaking professional and managerial sample)

Table 4.1: Type table for OPPassessment data (reported type, n=13,430)

ISTJ	ISFJ	INFJ	INTJ
n=1,204 9.0% SSR=0.65**	n=383 2.9% SSR=0.22**	n=110 0.8% SSR=0.48**	n=322 2.4% SSR=1.70*
ISTP	**ISFP**	**INFP**	**INTP**
n=538 4.0% SSR=0.62**	n=182 1.4% SSR=0.22**	n=240 1.8% SSR=0.56**	n=530 3.9% SSR=1.61**
ESTP	**ESFP**	**ENFP**	**ENTP**
n=1,218 9.1% SSR=1.56**	n=599 4.5% SSR=0.51**	n=1,069 8.0% SSR=1.26*	n=1,745 13.0% SSR=4.72**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=2,490 18.5% SSR=1.78**	n=940 7.0% SSR=0.56**	n=502 3.7% SSR=1.36*	n=1,358 10.1% SSR=3.44**

Type	n	%
E	9,921	73.9%**
I	3,509	26.1%**
S	7,554	56.2%**
N	5,876	43.8%**
T	9,405	70.0%**
F	4,025	30.0%**
J	7,309	54.4%**
P	6,121	45.6%**

*Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

The most common single type preference is ESTJ (19% of the total); this is a common finding with managerial groups in other countries. The SSR results suggest that, in comparison with the UK general population, those with preferences for NT are over-represented and those with preferences for SF are under-represented. Again, this is a common finding with managerial groups.

General population sample

Table 4.2: Type table for Dutch general population sample (n=214)

ISTJ	ISFJ	INFJ	INTJ
n=17 7.9% SSR=0.58*	n=25 11.7% SSR=0.92	n=2 0.9% SSR=0.53	n=5 2.3% SSR=1.64
ISTP	**ISFP**	**INFP**	**INTP**
n=12 5.6% SSR=0.88	n=7 3.3% SSR=0.54	n=8 3.7% SSR=1.16	n=5 2.3% SSR=0.96
ESTP	**ESFP**	**ENFP**	**ENTP**
n=17 7.9% SSR=1.36	n=20 9.3% SSR=1.07	n=20 9.3% SSR=1.48	n=15 7.0% SSR=2.50**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=23 10.7% SSR=1.03	n=21 9.8% SSR=0.77	n=7 3.3% SSR=1.18	n=10 4.7% SSR=1.62

Type	n	%
E	133	62.1%**
I	81	37.9%**
S	142	66.4%**
N	72	33.6%**
T	104	48.6%
F	110	51.4%
J	110	51.4%
P	104	48.6%

*Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

The most common single type preference amongst this sample is ISFJ (12% of the total), closely followed by ESTJ (11%). ISFJ is the second most common single type preference amongst the UK general population sample (13%), with ESTJ being the fourth most common (10%).

Overall, the SSR results suggest that the Dutch sample is similar to the UK general population group, but that it contains a slightly higher proportion of people with preferences for Extraversion and Intuition. However, the reader should bear in mind that the Dutch sample is considerably smaller than the UK sample, and therefore these findings should be treated with caution.

Management development programme participants

Table 4.3: Type table for management development programme participants (reported type, n=392)

ISTJ	ISFJ	INFJ	INTJ
n=35 8.9% SSR=0.65*	n=2 0.5% SSR=0.04**	n=1 0.3% SSR=0.15*	n=18 4.6% SSR=3.26**
ISTP	**ISFP**	**INFP**	**INTP**
n=8 2.0% SSR=0.32**	n=2 0.5% SSR=0.08**	n=10 2.6% SSR=0.80	n=24 6.1% SSR=2.50**
ESTP	**ESFP**	**ENFP**	**ENTP**
n=37 9.4% SSR=1.62**	n=6 1.5% SSR=0.18**	n=15 3.8% SSR=0.61	n=62 15.8% SSR=5.74**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=101 25.8% SSR=2.48**	n=9 2.3% SSR=0.18**	n=9 2.3% SSR=0.83	n=53 13.5% SSR=4.60**

Type	n	%
E	292	74.5%**
I	100	25.5%**
S	200	51.0%**
N	192	49.0%**
T	338	86.2%**
F	54	13.8%**
J	228	58.2%
P	164	41.8%

*Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

The type distribution is similar to the OPPassessment sample described in Table 4.1, with ESTJ (26% of the total) being the most common single type preference, and NT being over-represented and SF being under-represented. The main difference between the two distributions is a higher proportion of people with a preference for Thinking amongst the group shown here. This is likely to be at least partly a gender effect, as this sample contains a higher proportion of males (88%) than does the OPPassessment group (64%).

MBTI qualifying training course delegates

Reported type results from the MBTI instrument and best-fit (validated) type were available for the whole group.

Table 4.4: Type tables for training course delegates

Reported type (n=197)

ISTJ	ISFJ	INFJ	INTJ
n=9 4.6% SSR=0.34**	n=8 4.1% SSR=0.32**	n=3 1.5% SSR=0.88	n=5 2.5% SSR=1.79
ISTP	**ISFP**	**INFP**	**INTP**
n=4 2.0% SSR=0.31*	n=7 3.6% SSR=0.59	n=12 6.1% SSR=1.91*	n=7 3.6% SSR=1.50
ESTP	**ESFP**	**ENFP**	**ENTP**
n=9 4.6% SSR=0.79	n=13 6.6% SSR=0.76	n=45 22.8% SSR=3.62**	n=21 10.7% SSR=3.82**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=16 8.1% SSR=0.78	n=8 4.1% SSR=0.33**	n=22 11.2% SSR=4.00**	n=8 4.1% SSR=1.41

Type	n	%
E	142	72.1%**
I	55	27.9%**
S	74	37.6%**
N	123	62.4%**
T	79	40.1%
F	118	59.9%
J	79	40.1%**
P	118	59.9%**

Best-fit type (n=197)

ISTJ	ISFJ	INFJ	INTJ
n=7 3.6% SSR=0.26**	n=7 3.6% SSR=0.28**	n=9 4.6% SSR=2.71**	n=4 2.0% SSR=1.43
ISTP	**ISFP**	**INFP**	**INTP**
n=3 1.5% SSR=0.23**	n=8 4.1% SSR=0.67	n=20 10.2% SSR=3.19**	n=9 4.6% SSR=1.92
ESTP	**ESFP**	**ENFP**	**ENTP**
n=6 3.0% SSR=0.52	n=15 7.6% SSR=0.87	n=43 21.8% SSR=3.46**	n=21 10.7% SSR=3.82**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=13 6.6% SSR=0.63	n=14 7.1% SSR=0.56*	n=14 7.1% SSR=2.54**	n=4 2.0% SSR=0.69

Type	n	%
E	130	66.0%**
I	67	34.0%**
S	73	37.1%**
N	124	62.9%**
T	67	34.0%**
F	130	66.0%**
J	72	36.5%**
P	125	63.5%**

For both tables above: *Difference significant at $p<0.05$, based on chi-square results.
**Difference significant at $p<0.01$, based on chi-square results.

Looking at reported type, the most frequent type preference is ENFP (23% of the total), followed by ENFJ and ENTP (both 11%). Overall, the group tends to have a preference for Extraversion, and to a lesser extent for Intuition, Feeling and Perceiving.

In terms of best-fit type, ENFP (22%) is also the most frequently occurring type preference, followed by ENTP (11%) and INFP (10%). The general pattern is very similar to that found with reported type, with the group tending to have a preference for Extraversion and Feeling, and to a slightly lesser extent for Perceiving and Intuition.

It is known that people often feel pressure to exhibit more of a Thinking style of behaviour in business settings. This may help to explain why we find a lower proportion of Thinking types when we look at best-fit type than when we look at reported type.

Looking at the SSR figures it can be seen that, compared with the UK general population, those with a preference for Intuition are particularly over-represented.

Although not typical of the general population, similar results (especially with regard to Extraversion and Intuition) have been found with other groups of MBTI practitioners and MBTI qualifying training course delegates.

MBTI practitioners

Reported type results from the MBTI instrument and best-fit (validated) type were available for the whole group.

Table 4.5: Type table for MBTI practitioners

Reported type (n=199)

ISTJ	ISFJ	INFJ	INTJ
n=6 3.0% SSR=0.22**	n=9 4.5% SSR=0.36**	n=8 4.0% SSR=2.35*	n=11 5.5% SSR=3.93**
ISTP	**ISFP**	**INFP**	**INTP**
n=5 2.5% SSR=0.39*	n=8 4.0% SSR=0.66	n=23 11.6% SSR=3.63**	n=15 7.5% SSR=3.08**
ESTP	**ESFP**	**ENFP**	**ENTP**
n=5 2.5% SSR=0.43	n=4 2.0% SSR=0.23**	n=51 25.6% SSR=4.07**	n=22 11.1% SSR=4.01**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=8 4.0% SSR=0.39**	n=5 2.5% SSR=0.20**	n=8 4.0% SSR=1.46	n=11 5.5% SSR=1.88

Type	n	%
E	114	57.3%
I	85	42.7%
S	50	25.1%**
N	149	74.9%**
T	83	41.7%
F	116	58.3%
J	66	33.2%**
P	133	66.8%**

Best-fit type (n=199)

ISTJ	ISFJ	INFJ	INTJ
n=8 4.0% SSR=0.29**	n=10 5.0% SSR=0.39**	n=11 5.5% SSR=3.23**	n=13 6.5% SSR=4.64**
ISTP	**ISFP**	**INFP**	**INTP**
n=5 2.5% SSR=0.39*	n=8 4.0% SSR=0.66	n=25 12.6% SSR=3.95**	n=12 6.0% SSR=2.46**
ESTP	**ESFP**	**ENFP**	**ENTP**
n=4 2.0% SSR=0.35*	n=5 2.5% SSR=0.29**	n=44 22.1% SSR=3.51**	n=20 10.1% SSR=3.65**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=9 4.5% SSR=0.43**	n=5 2.5% SSR=0.20**	n=11 5.5% SSR=2.01*	n=9 4.5% SSR=1.54

Type	n	%
E	107	53.8%
I	92	46.2%
S	54	27.1%**
N	145	72.9%**
T	80	40.2%
F	119	59.8%
J	76	38.2%**
P	123	61.8%**

For both tables above: *Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

Looking at reported type, the most frequent type preference is ENFP (26% of the total), followed by INFP (12%). Overall, the group tends to have a preference for Intuition, and to a lesser extent for Perceiving, Feeling and Extraversion,.

In terms of best-fit type, ENFP (22%) is also the most frequently occurring type preference, followed by INFP (13%). The general pattern is very similar to that found with reported type, with the group tending to have a preference for Intuition, and to a lesser extent for Perceiving, Feeling and Extraversion.

Internal consistency reliability

The reliability of a test or questionnaire relates to how consistent and precise it is. The internal consistency reliability addresses the question of whether all the questions in a scale measure the same construct. A common measure of internal consistency reliability is coefficient alpha (Cronbach, 1951). The alpha coefficients for the Dutch samples are shown in Table 4.6

Table 4.6: Internal consistency reliability

Dimension	Coefficient alpha	
	General population	OPPassessment
E–I	0.86	0.85
S–N	0.71	0.77
T–F	0.84	0.80
J–P	0.86	0.83

It is generally agreed that internal consistency reliability should achieve a value of at least 0.7 for a test to be considered to be reliable.[5] On this basis, all of the dimensions of the questionnaire show good reliability in both groups. In addition, the alpha coefficients have been found to be consistent across different age groups and across males and females.

[5] For example, see Nunnally (1978) or Kline (2000).

Intercorrelations between MBTI dimensions

One of the original aims of developing the MBTI questionnaire was to see if dimensions could be produced that were independent of each other. Results from other language versions have shown that this was achieved with all dimensions except Sensing–Intuition and Judging–Perceiving. This shows up despite the fact that questions were carefully chosen to sort on only one dimension. The author of the questionnaire hypothesised that the S–N/J–P relationship may simply be a reflection of reality rather than a failing in the construction of the questionnaire.

The intercorrelations between dimensions amongst the Dutch OPPassessment sample are shown in Table 4.7. In order to be able to calculate the correlations, scores on each dimension were converted to continuous scores.[6]

Table 4.7: Intercorrelations between dimensions

	E–I	S–N	T–F	J–P
E–I		–0.18**	–0.12**	–0.07**
S–N			0.09**	0.40**
T–F				0.14**
J–P				

**Significant at p<0.01.

Although statistically significant, only very low correlations were found between most of the dimensions. The S–N/J–P relationship that has been found with other language versions has been replicated, showing that a preference for Sensing is likely to be associated with a preference for Judging, and that a preference for Intuition is likely to be associated with a preference for Perceiving.

[6] Continuous scores (Myers and McCaulley, 1985, p. 9) place an individual's score on each dimension onto a continuous scale with a mid-point of 100. To calculate continuous scores, Preference Clarity Index (PCI) scores for each dimension are either subtracted or added to 100, depending on which direction the overall preference is. PCI scores in the direction of E, S, T or J are subtracted from 100. PCI scores in the direction of I, N, F or P are added to 100.

Best-fit validity: the accuracy of the Dutch MBTI Step I instrument in predicting best-fit type

The purpose of the MBTI instrument is to help individuals to establish their validated or 'best-fit' psychological type. A key measure of the validity of the instrument is, therefore, how well the results relate to best-fit (validated) type. These data are useful to practitioners in knowing how typically accurate the reported result is likely to be.

Best-fit data are available for two of the samples, alongside reported type. The training delegates established their best-fit type as part of their training programme, and the best-fit data were collected for the whole sample (197 people). Best-fit data were also available for the Dutch MBTI practitioners (n=199).

Table 4.8 presents the results of the analysis comparing best-fit with reported type. The Dutch questionnaire performs in a similar way to other language versions for which best-fit data are available, and there is very good evidence for the accuracy of the instrument. In nearly 72% of cases, a respondent's reported type will match their best-fit type, and in 93% of cases at least three of the four preferences will match.

Table 4.8: Match of reported and best-fit type

	Dutch training course delegates (n=197)		Dutch MBTI practitioners (N=199)	
Agrees with four letters	71.6%	92.9%	71.9%	93.0%
Agrees with three letters	21.3%		21.1%	
Agrees with two letters	5.6%	7.1%	6.0%	7.0%
Agrees with one letter	1.0%		1.0%	
Agrees with no letters	0.5%		0.0%	

	Percentage agreement	
Dimension	Dutch training course delegates (n=197)	Dutch MBTI Practitioners (n=199)
E–I	89.8%	91.5%
S–N	92.4%	91.0%
T–F	89.8%	87.4%
J–P	90.4%	94.0%

Further analysis was carried out to investigate the validity and accuracy of the questionnaire. MBTI qualifying training course delegates and MBTI practitioners were asked how confident they felt about their results on each type dichotomy (on a scale from 1 to 5, where 5 indicated the highest degree of confidence). For every dimension, over 70% of each group were confident about their type, with a considerably higher proportion than this expressing confidence with their E–I, J–P and S–N preferences. This corresponds with the

findings of the best-fit research, where a high level of agreement was found between reported and best-fit preferences for each of the four dimensions. All these figures provide further support for the validity of the MBTI approach. Detailed results are shown in Table 4.9.

Table 4.9: Degree of confidence in results

Degree of confidence	Percentage of group							
	E–I		S–N		T–F		J–P	
	Group 1[7]	Group 2[8]	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2
5 (highest)	45%	46%	41%	40%	39%	43%	52%	53%
4	42%	32%	41%	39%	41%	28%	32%	28%
3	10%	13%	13%	9%	15%	15%	9%	10%
2	3%	6%	5%	10%	5%	11%	7%	6%
1 (lowest)	1%	2%	1%	2%	0%	2%	1%	2%
% at 4 or above	*87%*	*78%*	*82%*	*79%*	*80%*	*71%*	*84%*	*81%*

[7] Training course delegates.
[8] MBTI practitioners.

Construct validity: the relationship between MBTI best-fit type and 16PF scores

A study was carried out to explore the relationship between MBTI best-fit type and scores on the Dutch version of the 16PF instrument, a trait-based personality questionnaire (Cattell, Cattell and Cattell, 1993). Details of the traits measured by the 16PF questionnaire are provided in Appendix 2. Technical details of the Dutch version of the questionnaire are available from OPP (see *Nederlandse 16PF® Testhandleiding*, IPAT, 2007).

The sample comprised 95 respondents, 46 male (48.4%) and 49 female (51.6%). The mean age was 42 years. Sixty-one per cent of the sample were of Dutch nationality and 34% were of Belgian nationality. All were MBTI respondents who knew their best-fit type.

Table 4.10 shows the number and percentage of each of the 16 MBTI types within this sample.

Table 4.10: MBTI best-fit type table

ISTJ	ISFJ	INFJ	INTJ
n=4 4.2%	n=2 2.1%	n=4 4.2%	n=7 7.4%
ISTP	**ISFP**	**INFP**	**INTP**
n=3 3.2%	n=3 3.2%	n=11 11.6%	n=6 6.3%
ESTP	**ESFP**	**ENFP**	**ENTP**
n=2 2.1%	n=1 1.1%	n=19 20.0%	n=14 14.7%
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=4 4.2%	n=4 4.2%	n=5 5.3%	n=6 6.3%

Type	n	%
E	55	57.9%
I	40	42.1%
S	23	24.2%
N	72	75.8%
T	46	48.4%
F	49	51.6%
J	36	37.9%
P	59	62.1%

Amongst this group, ENFP (20%) is the most frequently occurring type preference, followed by ENTP (15%) and INFP (12%). Overall, the group tends to have a preference for Intuition, and to a lesser extent for Perceiving and Extraversion. There is a fairly even split of Thinking and Feeling types.

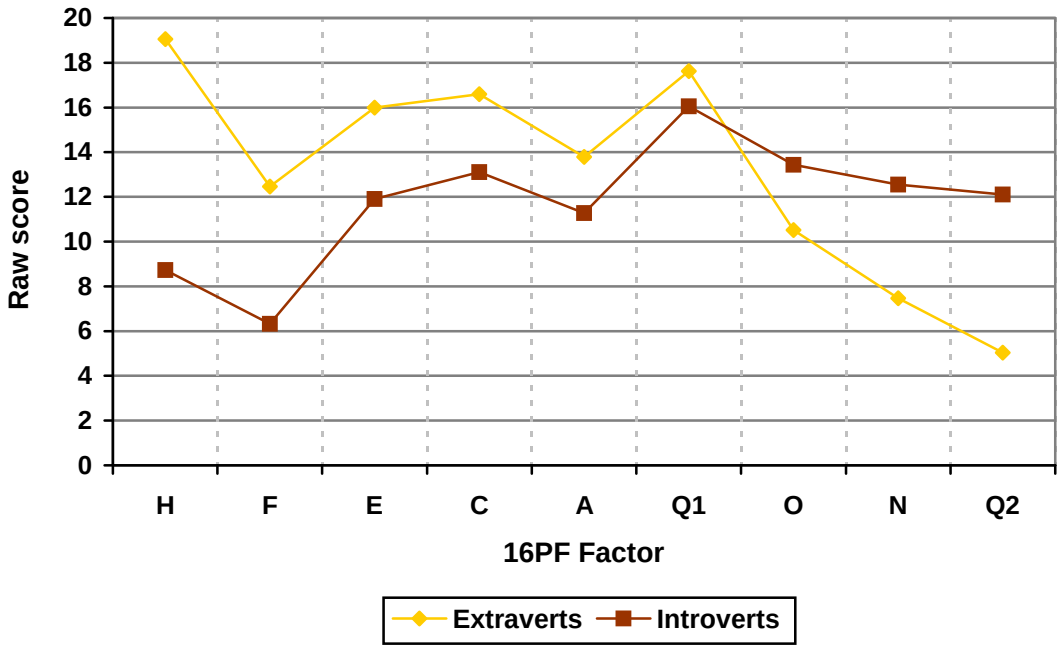
Tables 4.11–4.14 and Figures 4.1–4.4 show the mean 16PF raw scores for individuals of each dichotomous preference, for those factors where significant differences were found between the mean raw scores obtained by people with different dichotomous preferences. Also shown are the differences between the mean raw scores (mean difference), the differences between the means as a proportion of the overall standard deviation (effect size) and the statistical significance of the difference (based on an independent samples t-test). The factors are shown in descending order of differences, based on the effect size (in the direction of E,S, T and J).

Table 4.11: Extraverted (E) versus Introverted (I) types

Factor		E mean	I mean	Mean difference	Effect size	Significance level
H	Social Boldness	19.06	8.73	10.33	1.65	***
F	Liveliness	12.46	6.33	6.14	1.34	***
E	Dominance	16.00	11.90	4.10	0.77	***
C	Emotional Stability	16.60	13.10	3.50	0.76	***
A	Warmth	13.79	11.28	2.52	0.75	***
Q1	Openness to Change	17.62	16.05	1.56	0.51	*
O	Apprehension	10.51	13.43	–2.92	–0.55	**
N	Privateness	7.47	12.54	–5.07	–0.95	***
Q2	Self-Reliance	5.04	12.10	–7.07	–1.21	***

Significant at: *p<0.05, **p<0.01, ***p<0.001.

Figure 4.1: Mean raw scores of Extraverted and Introverted types on the 16PF scales



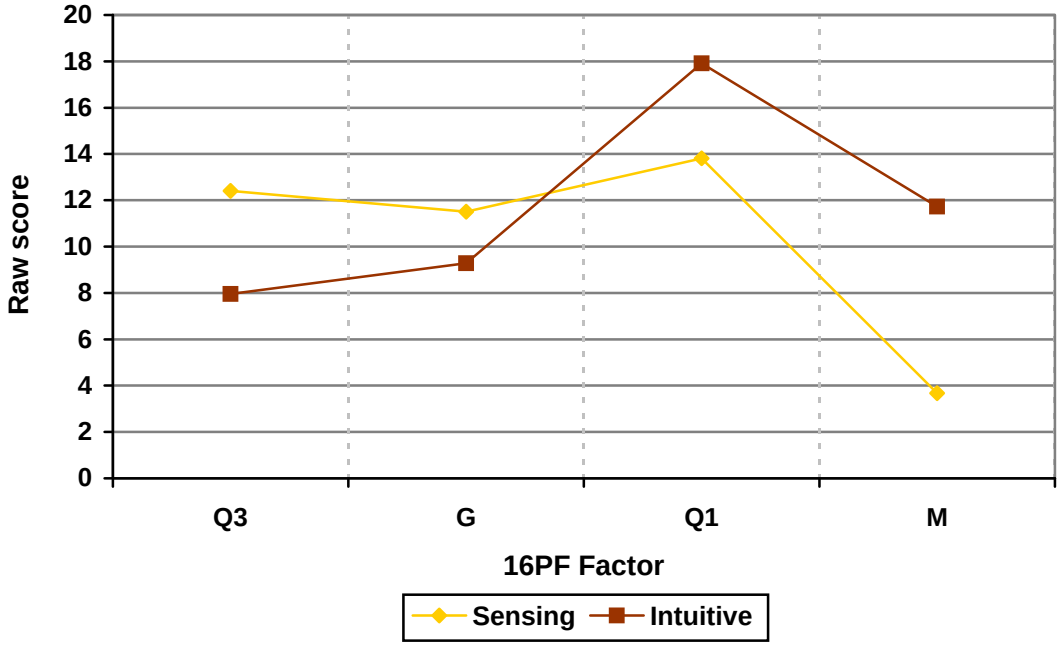
Those respondents showing a preference for Extraversion tend to score higher on Social Boldness (H), Liveliness (F), Dominance (E), Emotional Stability (C), Warmth (A) and Openness to Change (Q1). Those with a preference for Introversion tend to score higher on Self-Reliance (Q2), Privateness (N) and Apprehension (O).

Table 4.12: Sensing (S) versus Intuitive (N) types

Factor		S mean	I mean	Mean difference	Effect size	Significance level
Q3	Perfectionism	12.41	7.96	4.45	0.78	***
G	Rule-Consciousness	11.50	9.28	2.22	0.48	*
Q1	Openness to Change	13.81	17.91	–4.10	–1.34	***
M	Abstractedness	3.68	11.73	–8.05	–1.49	***

Significant at: *p<0.05, **p<0.01, ***p<0.001.

Figure 4.2: Mean raw scores of Sensing and Intuitive types on the 16PF scales



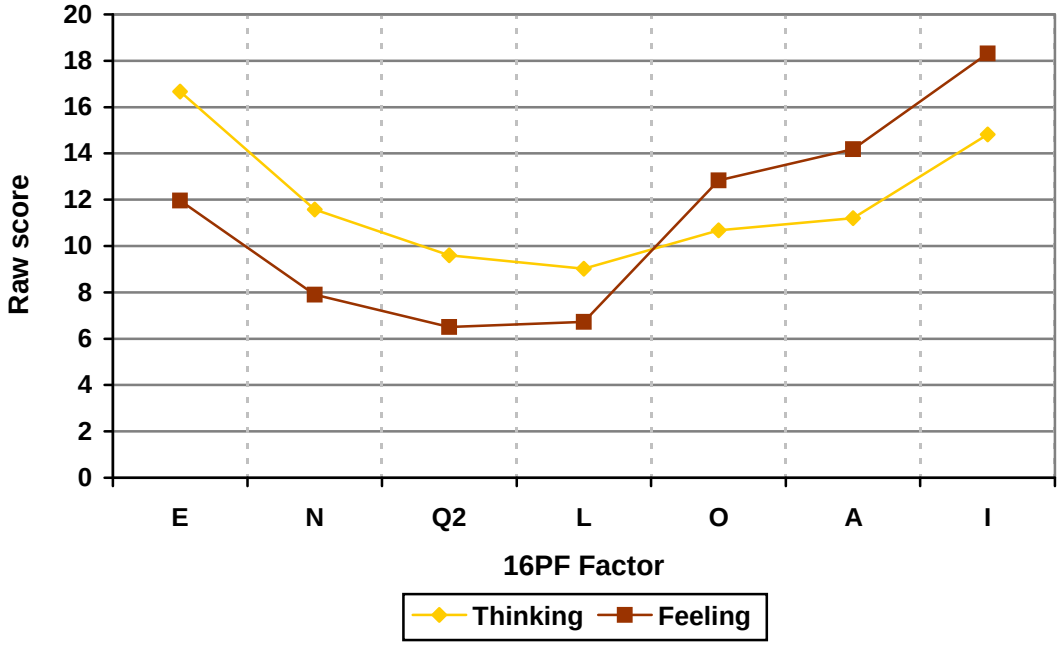
Those with a preference for Sensing tend to score higher on Perfectionism (Q3) and Rule-Consciousness (G). Those with a preference for Intuition tend to score higher on Abstractness (M) and Openness to Change (Q1).

Table 4.13: Thinking (T) versus Feeling (F) types

Factor		T mean	F mean	Mean difference	Effect size	Significance level
E	Dominance	16.67	11.96	4.71	0.88	***
N	Privateness	11.58	7.90	3.68	0.69	***
Q2	Self-Reliance	9.60	6.50	3.10	0.53	**
L	Vigilance	9.02	6.72	2.30	0.51	*
O	Apprehension	10.68	12.83	–2.15	–0.41	*
A	Warmth	11.20	14.19	–2.99	–0.89	***
I	Sensitivity	14.82	18.31	–4.49	–0.89	***

Significant at: *p<0.05, **p<0.01, ***p<0.001.

Figure 4.3: Mean raw scores of Thinking and Feeling types on the 16PF scales



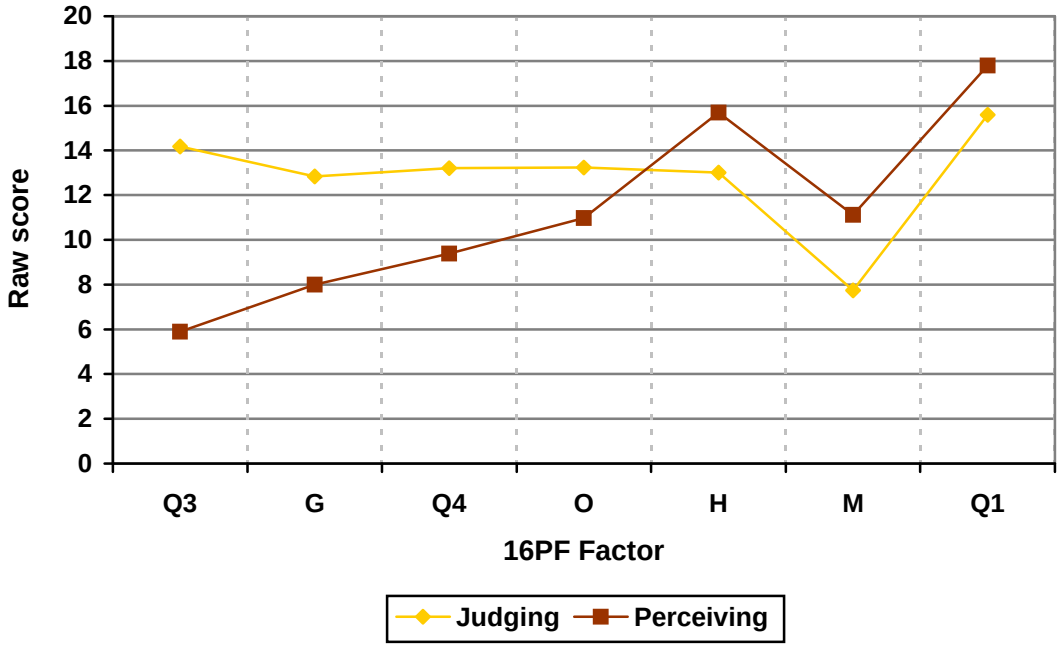
Those with a preference for Thinking tend to score higher on Dominance (E), Privateness (N), Self-Reliance (Q2) and Vigilance (L). Those with a preference for Feeling tend to score higher on Sensitivity (I), Warmth (A) and Apprehension (O).

Table 4.14: Judging (J) versus Perceiving (P) types

Factor		J mean	P mean	Mean difference	Effect size	Significance level
Q3	Perfectionism	14.18	5.89	8.29	1.45	***
G	Rule-Consciousness	12.83	8.00	4.83	1.04	***
Q4	Tension	13.20	9.39	3.82	0.78	***
O	Apprehension	13.24	10.97	2.28	0.43	*
H	Social Boldness	13.00	15.69	–2.69	–0.43	*
M	Abstractedness	7.74	11.12	–3.38	–0.62	**
Q1	Openness to Change	15.59	17.79	–2.20	–0.72	**

Significant at: *p<0.05, **p<0.01, ***p<0.001.

Figure 4.4: Mean raw scores of Judging and Perceiving types on the 16PF scales



Those with a preference for Judging tend to score higher on Perfectionism (Q3), Rule-Consciousness (G), Tension (Q4) and Apprehension (O). Those with a preference for Perceiving tend to score higher on Openness to Change (Q1), Abstractedness (M) and Social Boldness (H).

These findings correspond closely with those found by previous research (eg Hackston, McPherson and Hindmarch, 2004; Russell and Karol, 1994).

In summary, there is good evidence for the validity of the Dutch MBTI Step I instrument. Specifically:

- There is a high level of agreement between best-fit and reported type, as high as for other European language versions.
- Respondents are confident about their results.
- MBTI reported type preferences show significant relationships with scores on several 16PF factors, in a way that might be expected.

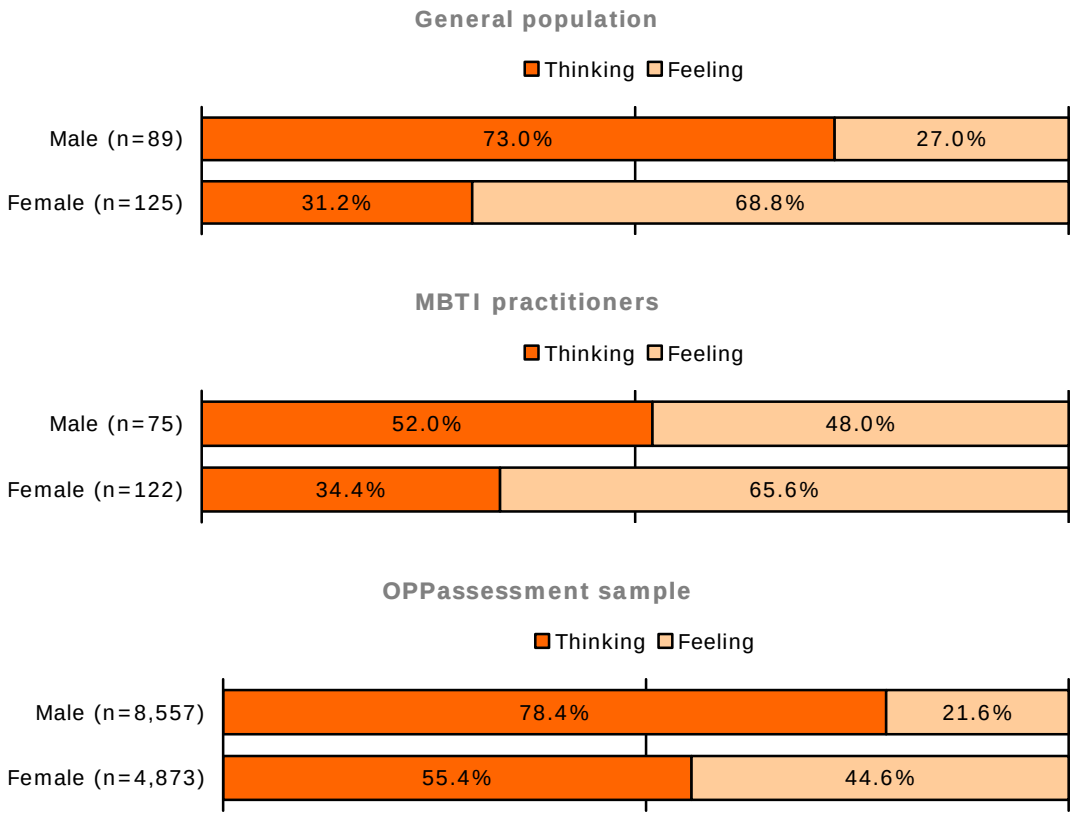
Group differences in type

Across four of the five samples for which reported type data were available, a variety of different demographic information was collected. The relationship of type to each of these factors is described below.

Gender

Most groups who take the MBTI questionnaire show a significant gender difference on the Thinking–Feeling dimension, and this is the case for three of the four groups in this study, as shown in Figure 4.5.[9] No significant gender difference was found amongst the training delegate group.

Figure 4.5: Gender differences on the T–F dimension



When compared with the T–F distribution in the combined sample, Thinking preferences are over-represented amongst men and Feeling preferences are over-represented amongst women. This effect has been found many times with many different versions of the instrument in a number of different cultures.

[9] General population: $\chi^2=36.42$; significant at $p<0.001$. MBTI practitioners: $\chi^2=8.72$; significant at $p<0.05$. OPPassessment sample: $\chi^2=779.14$; significant at $p<0.001$.

Age

Previous research using UK Step I continuous scores has shown significant correlations between age and three of the four dimensions (Warr, Miles and Platts, 2001). Older people were more likely than younger people to have preferences for Introversion, Sensing and Judging.

The data in this supplement were analysed in a slightly different way, by looking for differences in average age between people with preferences for Extraversion versus those with preferences for Introversion, for Sensing versus Intuition, for Thinking versus Feeling and for Judging versus Perceiving. The OPPassessment sample showed statistically significant relationships between age and three of the dimensions.[10] The mean age of people with a preference for Introversion and/or Sensing was approximately one year higher than of those with a preference for Extraversion and/or Intuition. The mean age of those with a preference for Feeling was approximately two years higher than of those with a preference for Thinking. This analysis was not carried out with the other samples because of their small size.

Table 4.15: Significant mean age differences

	Extraversion	Introversion	Difference	Sig.
Mean age (years)	37.28	38.51	1.23	***

	Sensing	Intuition	Difference	Sig.
Mean age (years)	37.94	37.16	0.78	***

	Thinking	Feeling	Difference	Sig.
Mean age (years)	36.97	39.02	2.05	***

Difference significant at: *p<0.05, **p<0.01, ***p<0.001.

Occupational level

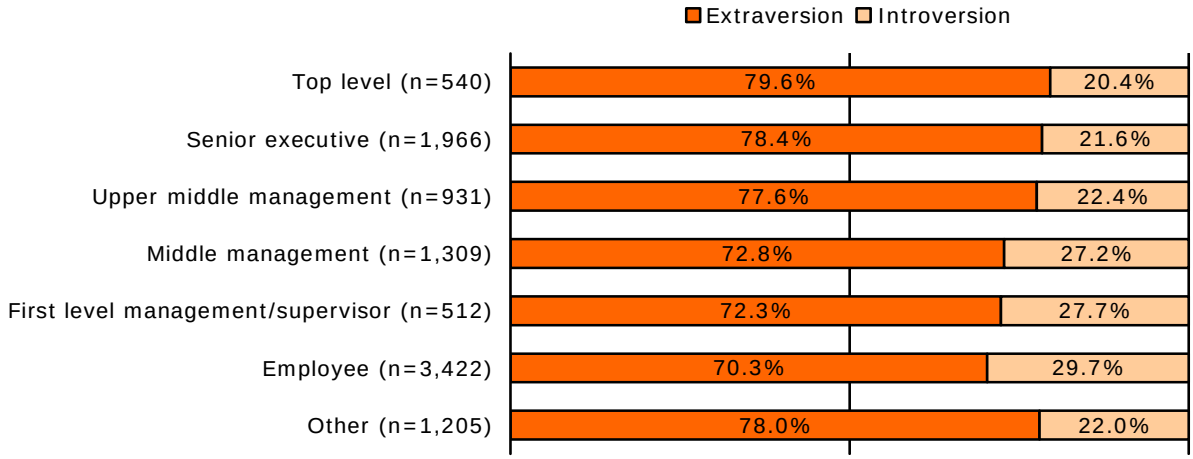
Previous research in other countries has demonstrated that individuals in higher level jobs in organisations are more likely to have preferences for Intuition and for Thinking than those in lower level jobs (Quenk, Hammer and Majors, 2004). This is reflected in the relationship of the Sensing–Intuition and Thinking–Feeling dimensions with occupational level in the OPPassessment sample. A relationship was also found with the Extraversion–Introversion dimension.

The data suggest that individuals at the top level are most likely to have a preference for Extraversion, and that the proportion of people

[10] Independent-samples t-tests; EI, SN and TF all significant at p<0.001.

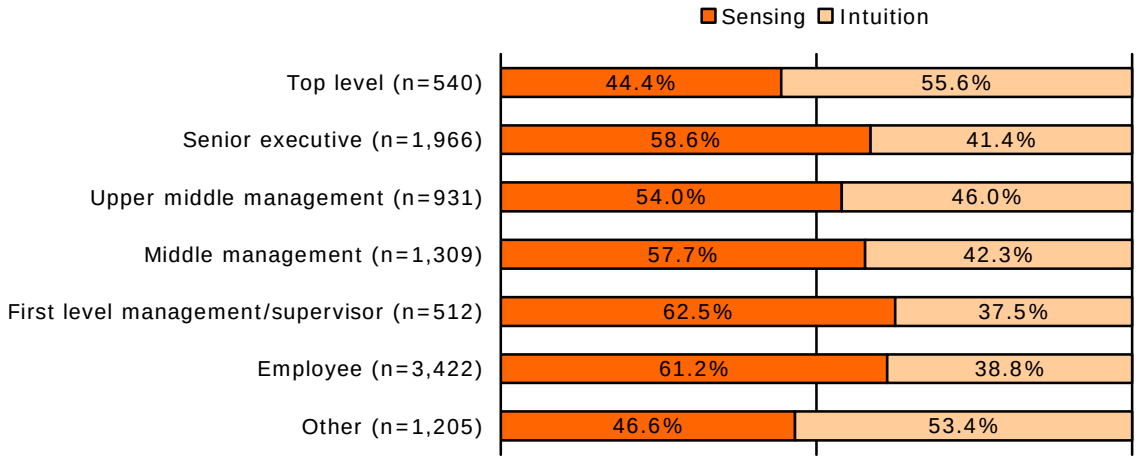
with an Extraversion preference decreases steadily with decreasing occupational level, as shown in Figure 4.6.

Figure 4.6: Extraversion–Introversion[11] and occupational level (OPPassessment data)



The data also suggest that individuals at the top level are most likely to have a preference for Intuition, followed by upper middle managers. The proportions of those with preferences for Intuition were lowest amongst people from first level middle management down to employee level, as shown in Figure 4.7.

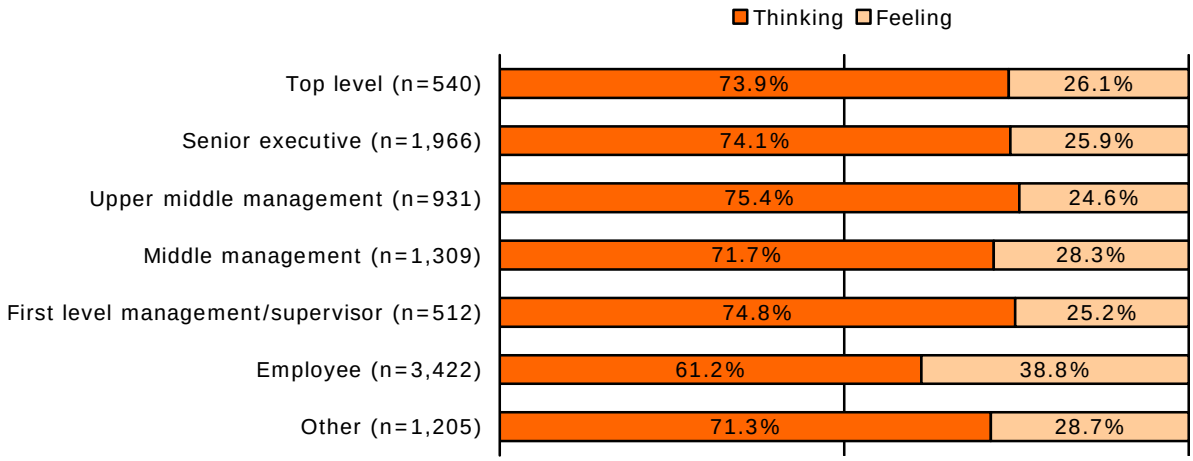
Figure 4.7: Sensing–Intuition[12] and occupational level (OPPassessment data)



[11] χ^2=70.79; significant at p<0.001.
[12] χ^2=124.07; significant at p<0.001.

It was also found that those with preferences for Thinking are slightly under-represented at employee level, as shown in Figure 4.8. All other levels contained a similar (higher) proportion of Thinking types.

Figure 4.8: Thinking–Feeling[13] and occupational level (OPPassessment data)



Note also that in this data set as a whole, preferences for Extraversion, Intuition and Thinking are over-represented in comparison with the UK general population.

Education

The data for the MBTI qualifying training course delegates showed no significant differences between the preferences of those educated to degree level (or above) and those who did not hold a degree. However, this finding is taken from a sample containing relatively few people who did not have a degree (14 individuals), so is inconclusive at this stage.

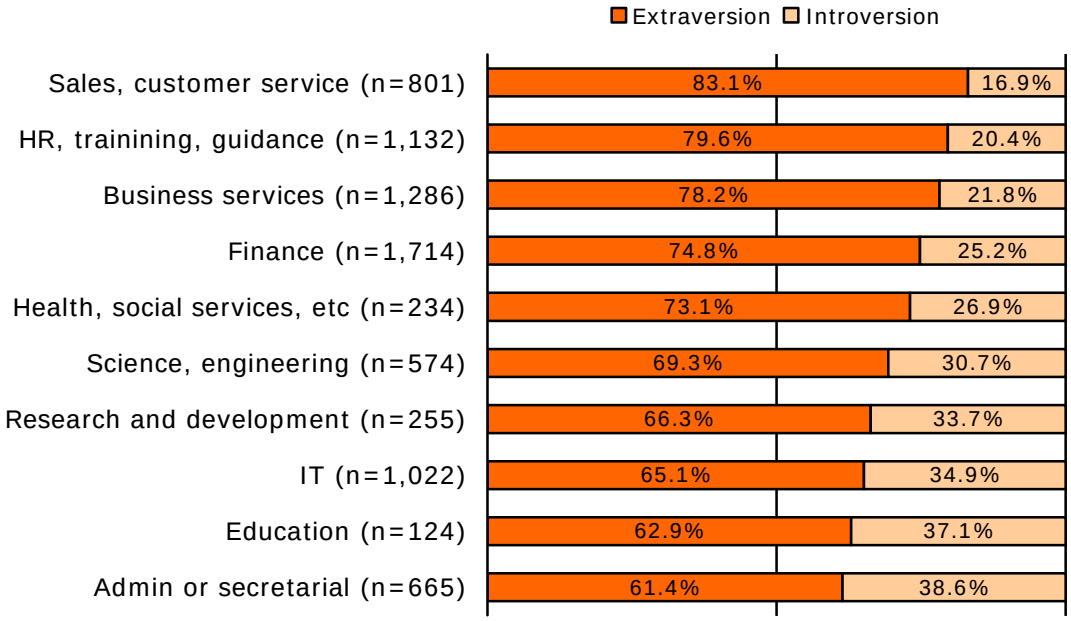
Specific educational qualifications were not available for the OPPassessment sample; however, the age at which individuals left full-time education was. There was found to be a link between preferences and the age at which individuals left full-time education, with people with preferences for Extraversion, Intuition, Thinking and Perceiving likely to have left education at a slightly older age. Although statistically significant, the differences in average age were never more than one year.

[13] $\chi^2=160.07$; significant at $p<0.001$.

Work area

Previous research into MBTI type suggests that an individual's type influences their choice of career (Hammer, 1998), and indeed there is a statistically significant relationship between each dimension and work area. In the figures that follow, categories have been re-ordered according to the percentage of E, S, T or J, and work areas with less than 100 respondents have been omitted (as well as undefined work areas such as 'Other').

Figure 4.9: Extraversion–Introversion[14] and work area



[14] χ^2=211.07; significant at p<0.001.

Figure 4.10: Sensing–Intuition[15] and work area

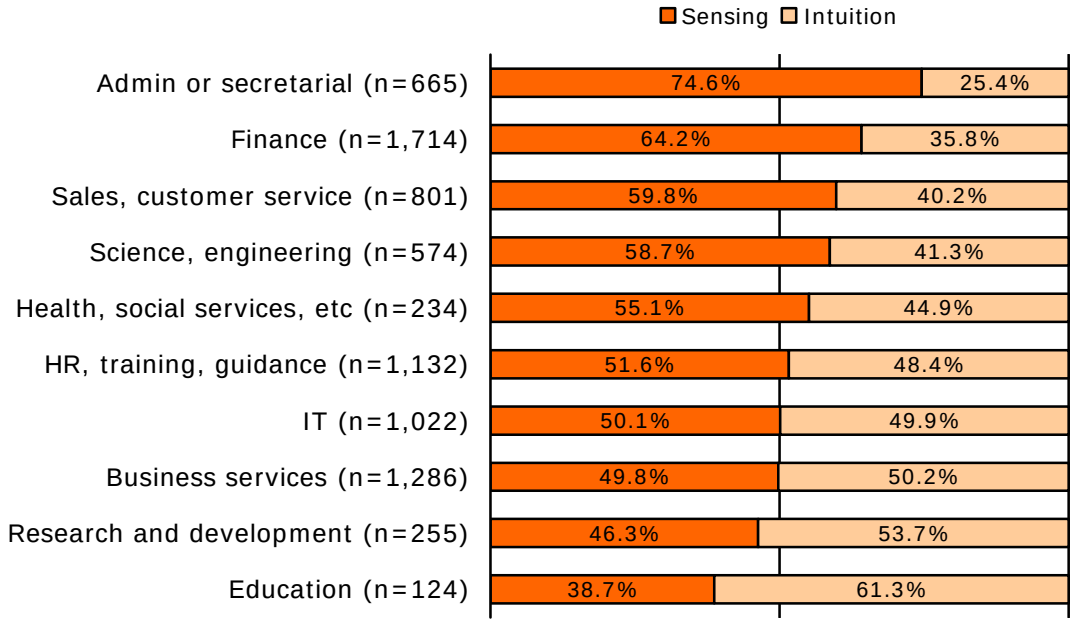
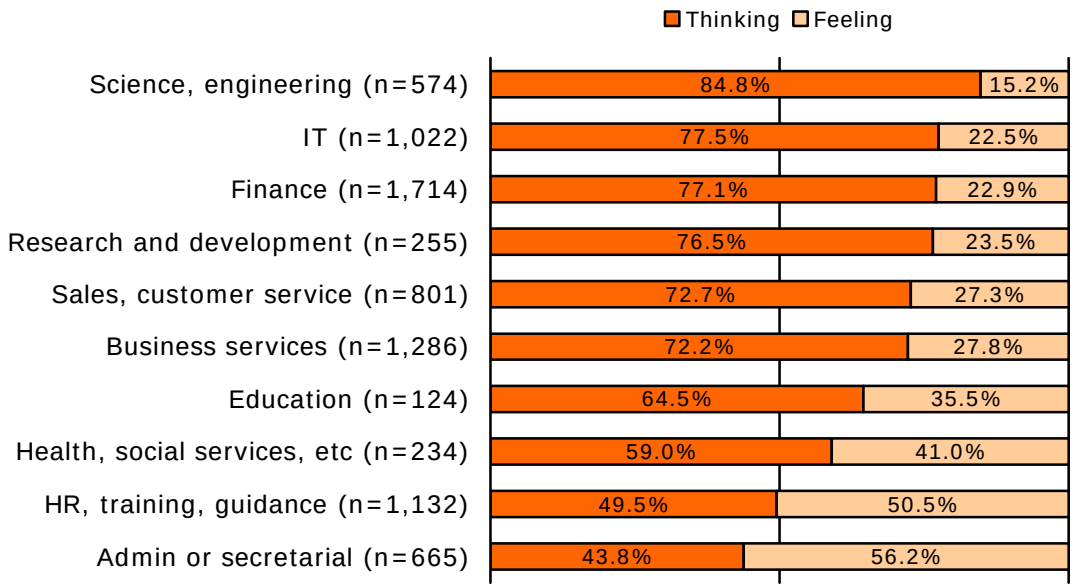
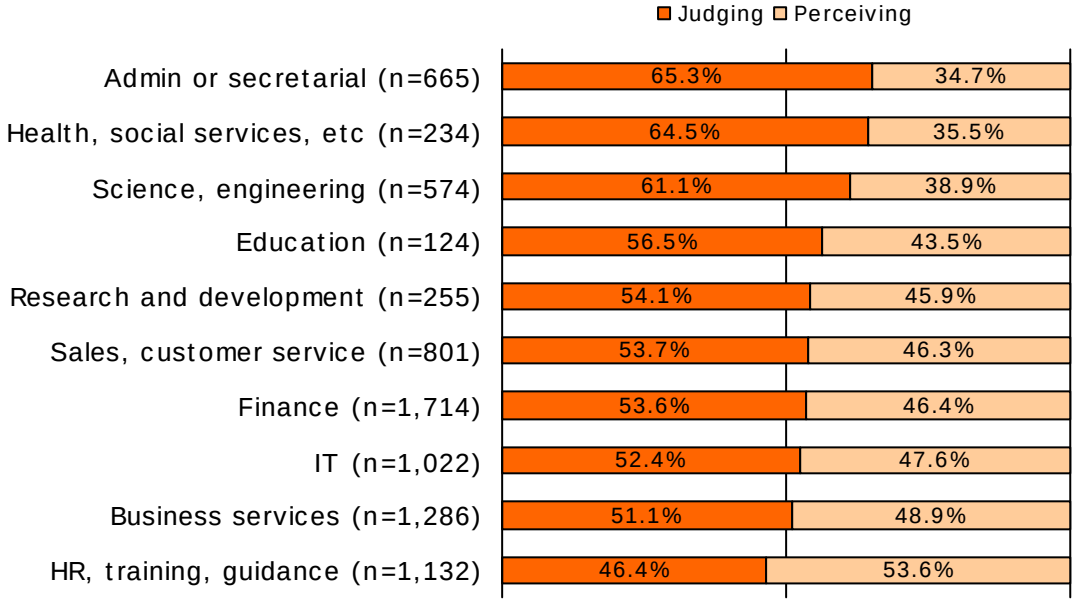


Figure 4.11: Thinking–Feeling[16] and work area



[15] χ^2=235.55; significant at p<0.001.
[16] χ^2=598.25; significant at p<0.001.

Figure 4.12: Judging–Perceiving[17] and work area



Nationality

For the OPPassessment group, information on nationality was available. Eighty per cent of the group were Dutch and 18% were Belgian. The remaining 2% were of a range of other nationalities. Type tables for the two main nationalities are shown below, along with a table summarising the differences. Analysis suggested that the Dutch sub-group was significantly more likely to have preferences for Extraversion,[18] Intuition,[19] Feeling[20] and Perceiving[21] than the Belgian sub-group.

[17] χ^2=109.17; significant at p<0.001.
[18] χ^2=29.64; significant at p<0.001.
[19] χ^2=18.44; significant at p<0.001.
[20] χ^2=22.74; significant at p<0.001.
[21] χ^2=57.98; significant at p<0.001.

Table 4.16: Type table for Dutch respondents (reported type, n=9,348)

ISTJ	ISFJ	INFJ	INTJ
n=739 7.9% SSR=0.58**	n=253 2.7% SSR=0.21**	n=73 0.8% SSR=0.46**	n=208 2.2% SSR=1.58*
ISTP	**ISFP**	**INFP**	**INTP**
n=358 3.8% SSR=0.60**	n=138 1.5% SSR=0.24**	n=174 1.9% SSR=0.58**	n=358 3.8% SSR=1.56**
ESTP	**ESFP**	**ENFP**	**ENTP**
n=882 9.4% SSR=1.62**	n=473 5.1% SSR=0.58**	n=794 8.5% SSR=1.35**	n=1,243 13.3% SSR=4.83**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=1,677 17.9% SSR=1.72**	n=655 7.0% SSR=0.56**	n=373 4.0% SSR=1.45*	n=950 10.2% SSR=3.46**

Type	n	%
E	7,047	75.4%**
I	2,301	24.6%**
S	5,175	55.4%**
N	4,173	44.6%**
T	6,415	68.6%**
F	2,933	31.4%**
J	4,928	52.7%**
P	4,420	47.3%**

Table 4.17: Type table for Belgian Dutch-speaking respondents (reported type, n=2,034)

ISTJ	ISFJ	INFJ	INTJ
n=261 12.8% SSR=0.94	n=76 3.7% SSR=0.29**	n=19 0.9% SSR=0.55*	n=54 2.7% SSR=1.89**
ISTP	**ISFP**	**INFP**	**INTP**
n=90 4.4% SSR=0.69**	n=12 0.6% SSR=0.10**	n=30 1.5% SSR=0.46**	n=77 3.8% SSR=1.55*
ESTP	**ESFP**	**ENFP**	**ENTP**
n=153 7.5% SSR=1.29*	n=52 2.6% SSR=0.29**	n=128 6.3% SSR=1.00	n=231 11.4% SSR=4.12**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=440 21.6% SSR=2.08**	n=148 7.3% SSR=0.58**	n=64 3.1% SSR=1.14	n=199 9.8% SSR=3.33**

Type	n	%
E	1,415	69.6%**
I	619	30.4%**
S	1,232	60.6%**
N	802	39.4%**
T	1,505	74.0%**
F	529	26.0%**
J	1,261	62.0%*
P	773	38.0%*

For both tables above: *Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

Table 4.18: Summary of differences by nationality

	E	I	S	N	T	F	J	P
Dutch (n=9,348)	75%	25%	55%	45%	69%	31%	53%	47%
Belgian (n=2,034)	70%	30%	61%	39%	74%	26%	62%	38%

Employment status

Employment status (available for the OPPassessment sample) showed a relationship with the Sensing–Intuition, Thinking–Feeling and Judging-Perceiving dimensions. Those who were self-employed were more likely than other groups to have a preference for Intuition,[22] whereas those who worked part-time were more likely than other groups to have a preference for Feeling.[23] This is likely to be a gender effect; 77% of part-time workers were female, compared with 37% of the total group and 30% of full-time workers.

[22] χ^2=35.36; significant at $p<0.001$.
[23] χ^2=267.19; significant at $p<0.001$.

Appendix 1: Sample descriptions

Sample 1: Data from OPPassessment (representative Dutch-speaking professional and managerial sample)

This sample consists of 13,430 individuals who completed the MBTI instrument in Dutch via the OPPassessment system between January 2004 and June 2008. Of these respondents, 64% were male and 36% were female. Age ranged from 17 to 75 years, with a mean of 38 and a median of 37.

Nationality was disclosed by 87% of respondents. Of these, 80% were Dutch and 18% Belgian.

Nationality	Percentage
Dutch	80.3%
Belgian	17.5%
Other	2.2%

The majority of the group were in full-time employment:

Employment status	Percentage
Full-time	79.6%
Part-time	14.5%
Self-employed	4.6%
Unemployed	1.1%
Homemaker	0.1%
Retired	0.1%

The majority of the group were of managerial level or above, although the largest single group was employee level (34.6%):

Occupational level	Percentage
Top level	5.5%
Senior executive	19.9%
Upper middle management	9.4%
Middle management	13.2%
First level management/supervisor	5.2%
Employee	34.6%
Other	12.2%

A range of work areas were represented:

Work area (job type)	Percentage
Finance	17.1%
Business services	12.9%
HR, training, guidance	11.3%
IT	10.2%
Sales, customer service	8.0%
Admin or secretarial	6.6%
Science, engineering	5.7%
Research and development	2.5%
Health, social services, etc.	2.3%
Education	1.2%
Land, sea or air transport	0.9%
Skilled operative	0.5%
Military, police, prison, fire	0.4%
Leisure, personal service	0.2%
Unskilled operative	0.1%
Other public sector	5.0%
Other private sector	2.5%
Other	12.3%

Sample 2: General population

This sample consisted of 214 individuals who completed a trial version of the MBTI questionnaire as part of the development of the Step II instrument in 2003. The sample was designed to be representative of the Dutch general population, and every individual was of Dutch nationality.

Of the sample group, 125 (58%) were female and 89 (42%) male; age ranged from 16 to 73 years (with an average age of 37).

In terms of occupational level, 76 individuals (36%) described themselves as being at employee level, with 15 (7%) at first level management or supervisory level, 37 (17%) at middle management level, and nine (4%) at top or senior executive level.

Sample 3: Management development programme participants

This sample consisted of 392 Dutch participants on management development programmes at Ashridge Business School, run between 2000 and 2003. Of this group, 88% were male and 12% female. Age ranged from 23 to 58 years.

Sample 4: MBTI qualifying training course delegates

This sample consisted of 197 delegates on Dutch MBTI training programmes from early 2005 to mid 2007. Of this group, 116 (58.9%) were female and 81 (41.1%) male; age ranged from 23 to 60 years (with an average age of 41).

Of this group, 175 individuals (89%) were educated to degree level or above. Of these, 15 (8%) held post-doctoral qualifications, 96 (49%) held a Doctorate and 62 (32%) held a Masters degree. The remaining two (8%) held a first degree.

In total, 117 (59%) described their employment status as full-time, whilst a further 45 people (23%) described themselves as self-employed. Thirty-four people (17%) worked part-time, and one person (1%) was not in employment.

In terms of occupational level, 46 people (23%) were at employee level, with four (2%) at first level management or supervisory level, 55 (28%) at middle management level, and 38 (19%) at top or senior executive level. Eight people (4%) described their job level as 'other', and the remaining 46 (23%) provided no details. The most common job type was 'HR, training, guidance' (154 people, or 78%).

Sample 5: MBTI practitioners (best-fit study)

This sample consisted of 199 MBTI practitioners who took part in a research study to look at the relationship between MBTI reported type and best-fit type.

Of this group, 122 (61%) were female and 75 (38%) were male. Age ranged from 23 to 63 years, with a mean of 42. Of these respondents, 118 respondents (59%) were Dutch, 56 (28%) were Belgian and two (1%) were of other nationalities; 23 (12%) did not disclose their nationality.

Eighty-eight people (44%) described themselves as working full-time, and 30 (15%) as working part-time. Forty-eight (24%) described their employment status as self-employed. Thirty respondents (15%) did not disclose their employment status.

In terms of occupational level, 43 people (22%) were at employee level, with eight (4%) at first level management or supervisory level, 29 (15%) at middle management level, and 40 (21%) at top or senior executive level. The most common job types amongst the group were 'HR, training, guidance' (76 people, or 38%), and 'Business services' (31 people, or 16%).

Sample 6: MBTI practitioners (MBTI vs 16PF study)

This group comprised 95 respondents: 46 male (48%) and 49 female (52%). The mean age was 42 years. Of the sample group, 61% were of Dutch nationality, and 34% were of Belgian nationality.

Nationality	Frequency	Percentage
Belgian	32	34%
German	1	1%
Dutch	58	61%
Other	1	1%
No data	3	3%

Educational levels were recorded in accordance with the Belgian and Dutch educational systems, respectively.

Belgian respondents:

Education level	Frequency	Percentage
Secondary education	4	11%
First degree	2	6%
Masters degree	26	74%
PhD	2	6%
No data	1	3%

Dutch respondents:

Education level	Frequency	Percentage
Unfinished Masters degree	1	2%
Higher professional education	15	25%
Masters degree	36	60%
No data	8	13%

Most of the Belgian sample (74%) had a Masters degree, and all of the Dutch sample had under taken further education.

Of the sample, 46 (48%) respondents worked full time, 14 (15%) part-time, 19 (20%) were self-employed, one (1%) was unemployed and one (1%) was a homemaker.

In terms of occupational level, 21 people (22%) were at employee level, with two (2%) at first level management or supervisory level, 23 (24%) at middle management level, and 19 (20%) at top or senior executive level. The most common job types amongst the group were 'HR, training, guidance' (56 people, or 59%) and 'Education' (seven people, or 7%).

Appendix 2: Brief summary of what the 16PF instrument measures

The 16PF instrument is a robust measure of personality traits. It was developed by Raymond Cattell in 1949 and is available in Dutch and many other languages. The current fifth edition is one of the most validated predictors of human behaviour and is based on over 50 years of research and testing.

The questionnaire assesses an individual's personality against the following 16 Primary Factors:

16PF Primary Factor	Description
A Warmth	Your desire to develop close relationships with others
B Reasoning	The extent to which you can solve numerical and verbal problems
C Emotional Stability	How calmly you respond to life's demands
E Dominance	Your tendency to assert influence and/or control others
F Liveliness	How freely and spontaneously you express yourself
G Rule-Consciousness	How much value you place on externally imposed rules
H Social Boldness	How comfortable you feel in social situations
I Sensitivity	The extent to which emotions and sentiments influence your outlook and judgment
L Vigilance	The extent to which you are cautious of others' motives
M Abstractedness	How much attention you give to abstract rather than concrete observations
N Privateness	How much you like to keep personal information to yourself
O Apprehension	How prone you are to self-criticism
Q1 Openness to Change	The extent to which you enjoy new situations and experiences
Q2 Self-Reliance	How much you enjoy your own company and trust your own judgment
Q3 Perfectionism	Whether you need to rely on structure rather than leaving things to chance
Q4 Tension	How easily situations can cause you frustration

Each of the Primary Factors also contributes to one or more of the five 'Global Factors'. These are:

16PF Global Factor	Description
Extraversion	This is about the extent to which an individual wants to be with or around other people, as opposed to spending time on their own, and the amount of energy they will invest in initiating and maintaining social relationships
Independence	This refers to an individual's style of self-expression and persuasion, and the extent to which they will want to go their own way/take charge of situations as opposed to cooperating and collaborating
Tough-Mindedness	This is about the extent to which an individual will experience the world in concrete, logical, unsentimental terms as opposed to paying attention to emotions, intuition and other, more subjective aspects
Self-Control	This is about how an individual structures and orders their life, the extent to which they control their impulses, their level of self-discipline, and therefore how predictable their behaviour is
Anxiety	This refers to the way that an individual manages the pressures and stresses in their life. It may refer to their general state of mind or reflect what is going on in their life at the time

MBTI® Step I instrument

European Data Supplement

Finnish

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Contents

Introduction

Data collected from the Finnish electronic version of the MBTI Step I questionnaire were analysed to produce the findings in this chapter. A brief description of the sample is given below, and further details are provided in Appendix 1.

- The sample consisted of 665 individuals who completed the MBTI Step I questionnaire in Finnish via the OPPassessment system between launch of the Finnish version in May 2007 and mid-2008.[1] This sample is considered to be representative of the groups of people with whom the Finnish MBTI instrument has been and will be used for applications such as management development, coaching, counselling and teambuilding. As such, it is likely to represent a cross-section of the Finnish-speaking professional and managerial population.

The results of the analyses are outlined below.

[1] OPPassessment allows personality questionnaires such as the MBTI instrument to be administered via email and/or completed online.

Type distribution

Type tables are a way of illustrating the proportion of each type within a particular group. Opposite is a type table for the Finnish sample described on the previous page.

For each of the 16 different types, the number of cases, the percentage of the total that this represents and the self-selection ratio (SSR) are shown. The SSR (Myers et al., 1998) is a way of demonstrating whether a given type appears more or less often in a particular group than would be expected given its frequency in a reference group. An SSR of greater than 1 indicates that a type is over-represented, and an SSR of less than 1 denotes that it is under-represented. Asterisks are used to denote whether the over- or under-representations are statistically significant, based on the results of chi-square analysis.[2]

Ideally, the type distribution from a large representative sample of the Finnish population would be used to calculate SSRs in this data supplement. However, such a sample does not currently exist. In its place, SSRs have been calculated using type data from the UK general population (Kendall, 1998), which can be justified by the fact that type distributions for comparable Finnish and British groups, such as managers and professionals, are similar. Evidence (eg Hackston and Kendall, 2004; Quenk et al., 2004; Kirby, Kendall and Barger, 2007) does suggest that although type-related behaviours vary a good deal from country to country and from culture to culture, the frequencies of underlying MBTI types do not.

[2] Chi-square analysis (often abbreviated to χ^2) is a technique used to explore whether observed frequency distributions differ significantly from other, predefined, distributions. In this case, the UK general population group is used as the reference group, and the chi-square analysis indicates whether the proportion of people of each type within a particular sample differs significantly from the proportion of people reporting the same type within the reference group.

OPPassessment data (representative Finnish-speaking professional and managerial sample)

Table 5.1: Type table for OPPassessment data (reported type, n=665)

ISTJ	ISFJ	INFJ	INTJ
n=73 11.0% SSR=0.80	n=18 2.7% SSR=0.21**	n=5 0.8% SSR=0.44	n=46 6.9% SSR=4.91**
ISTP	**ISFP**	**INFP**	**INTP**
n=17 2.6% SSR=0.40**	n=3 0.5% SSR=0.07**	n=2 0.3% SSR=0.09**	n=24 3.6% SSR=1.47
ESTP	**ESFP**	**ENFP**	**ENTP**
n=25 3.8% SSR=0.65*	n=7 1.1% SSR=0.12**	n=18 2.7% SSR=0.43**	n=74 11.1% SSR=4.04**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=174 26.2% SSR=2.51**	n=37 5.6% SSR=0.44**	n=24 3.6% SSR=1.31	n=118 17.7% SSR=6.04**

Type	n	%
E	477	71.7%**
I	188	28.3%**
S	354	53.2%**
N	311	46.8%**
T	551	82.9%**
F	114	17.1%**
J	495	74.4%**
P	170	25.6%**

*Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

The most common single type preference is ESTJ (26% of the total), followed by ENTJ (18%); this is a common finding with managerial groups in other countries. The SSR results suggest that, in comparison to the general population, those with preferences for NT are over-represented, and those with preferences for SF are under-represented. Again, this is a common finding with managerial groups.

Internal consistency reliability

The reliability of a test or questionnaire relates to how consistent and precise it is. Internal consistency reliability addresses the question of whether all the questions in a scale measure the same construct. A common measure of internal consistency reliability is coefficient alpha (Cronbach, 1951). The alpha coefficients for the Finnish OPPassessment sample are shown in Table 5.2.

Table 5.2: Internal consistency reliability

Dimension	Coefficient alpha
E–I	0.86
S–N	0.78
T–F	0.78
J–P	0.80

It is generally agreed that internal consistency reliability should achieve a value of at least 0.7 for a test to be considered to be reliable.[3] On this basis, all of the dimensions of the questionnaire show good reliability. In addition, the alpha coefficients have been found to be consistent across different age groups and across males and females.

[3] For example, see Nunnally (1978) or Kline (2000).

Intercorrelations between MBTI dimensions

One of the original aims of developing the MBTI questionnaire was to see if dimensions could be produced that were independent of each other. Results from other language versions have shown that this was achieved with all dimensions except Sensing–Intuition and Judging–Perceiving. This shows up despite the fact that questions were carefully chosen to sort on only one dimension. The author of the questionnaire hypothesised that the S–N/J–P relationship may simply be a reflection of reality rather than a failing in the construction of the questionnaire.

The intercorrelations between dimensions amongst the OPPassessment sample are shown in Table 5.3. In order to be able to calculate the correlations, scores on each dimension were converted to continuous scores.[4].

Table 5.3: Intercorrelations between dimensions

	E–I	S–N	T–F	J–P
E–I		–0.14**	–0.11**	0.00
S–N			–0.01	0.42**
T–F				0.08*
J–P				

Significant at: *p<0.05, **p<0.01.

Although statistically significant, only very low correlations were found between most of the dimensions. The S–N/J–P relationship that has been found with other language versions has been replicated, showing that a preference for Sensing is likely to be associated with a preference for Judging, and that a preference for Intuition is likely to be associated with a preference for Perceiving.

[4] Continuous scores (Myers and McCaulley, 1985, p. 9) place an individual's score on each dimension onto a continuous scale with a mid-point of 100. To calculate continuous scores, Preference Clarity Index (PCI) scores for each dimension are either subtracted or added to 100, depending on which direction the overall preference is. PCI scores in the direction of E, S, T or J are subtracted from 100. PCI scores in the direction of I, N, F or P are added to 100.

Validity: the accuracy of the Finnish MBTI Step I instrument in predicting best-fit type

At present, insufficient data have been collected for the Finnish language version to be able to report any best-fit validity results.

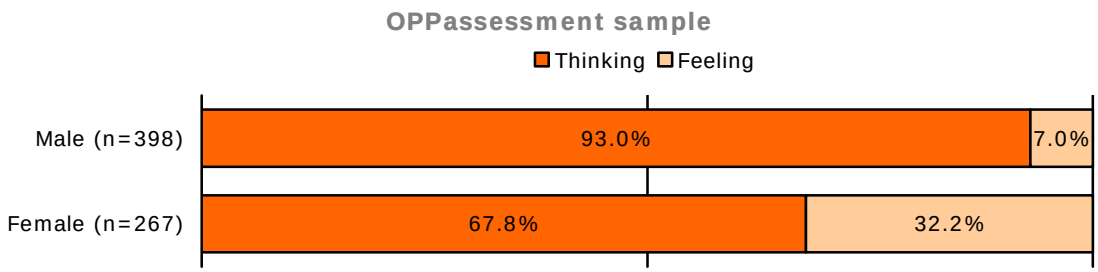
Group differences in type

Various types of demographic information were collected for the OPPassessment sample. The relationship of MBTI type to each of these factors is described below.

Gender

Most groups who take the MBTI questionnaire show a significant gender difference on the Thinking–Feeling dimension, and this is the case for the group in this study, as shown in Figure 5.1.[5]

Figure 5.1: Gender differences on the T–F dimension



When compared with the T–F distribution in the combined sample, Thinking preferences are over-represented amongst men and Feeling preferences are over-represented amongst women (although even amongst women in this group there are more individuals with a preference for Thinking than for Feeling). This effect has been found many times with many different versions of the instrument in a number of different cultures.

For this group, there were also significant gender differences on the Extraversion–Introversion[6] and Sensing–Intuition[7] dimensions, as shown in Figures 5.2 and 5.3. Introversion and Intuition preferences are both over-represented amongst men and Extraversion and Sensing preferences are both over-represented amongst women.

[5] $\chi^2=71.30$; significant at $p<0.001$.
[6] $\chi^2=5.61$; significant at $p<0.05$.
[7] $\chi^2=8.95$; significant at $p<0.01$.

Figure 5.2: Gender differences on the E–I dimension

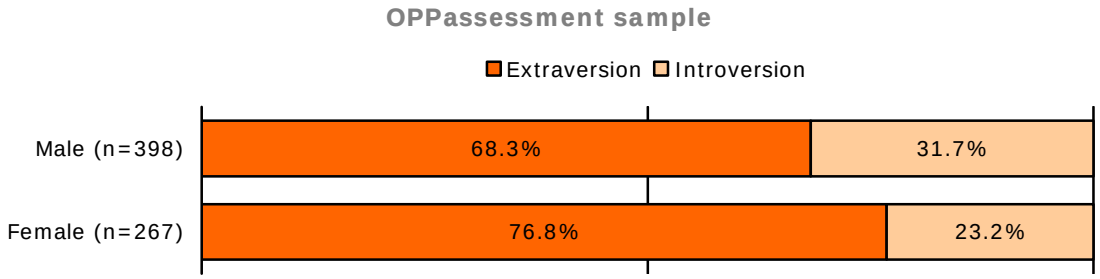
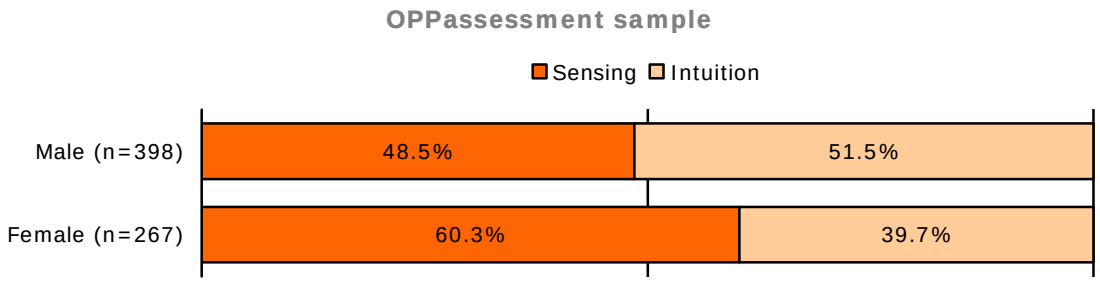


Figure 5.3: Gender differences on the S–N dimension



Age

Previous research using UK Step I continuous scores has shown significant correlations between age and three of the four dimensions (Warr, Miles and Platts, 2001). Older people were more likely than younger people to have preferences for Introversion, Sensing and Judging.

The data in this supplement were analysed in a slightly different way, by looking for differences in average age between people with preferences for Extraversion versus those with preferences for Introversion, for Sensing versus Intuition, for Thinking versus Feeling and for Judging versus Perceiving. The OPPassessment sample showed a statistically significant relationship between age and one of the dimensions,[8] as shown in Table 5.4. The mean age of people with a preference for Intuition was approximately one and a half years higher than of those with a preference for Sensing.

[8] Independent-samples t-test; significant at $p<0.05$.

Table 5.4: Significant mean age differences

	Sensing	Intuition	Difference	Significance
Mean age (years)	37.31	38.85	1.54	*

Difference significant at: *p<0.05, **p<0.01, ***p<0.001.

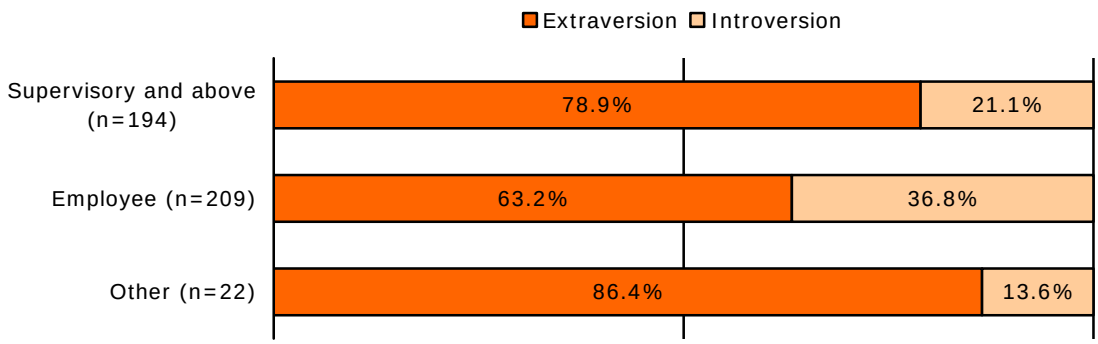
Occupational level

Previous research in other countries has demonstrated that individuals in higher level jobs in organisations are more likely to have preferences for Intuition and for Thinking than those in lower level jobs (Quenk, Hammer and Majors, 2004).

Although occupational-level data were captured for the Finnish sample, the number of people in some of the categories was too small to allow a full analysis. Therefore, individuals were split into two categories, 'employee' and 'supervisory and above'. These categories were used for the analysis. Significant differences were found between the two groups on two dimensions, Extraversion–Introversion and Thinking–Feeling.

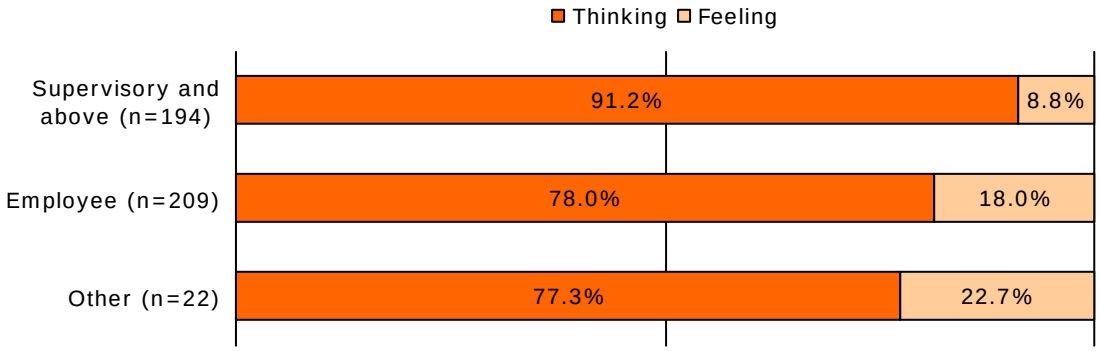
The data suggest that individuals in more senior positions are most likely to have a preference for Extraversion and for Thinking than those in more junior positions, as shown in Figures 5.4 and 5.5.

Figure 5.4: Extraversion–Introversion[9] and occupational level



[9] χ^2=11.99; significant at p<0.001.

Figure 5.5: Thinking–Feeling[10] and occupational level



Education

Specific educational qualifications were not available for the OPPassessment sample; however, the age at which individuals left full-time education was. There was found to be a link between one of the dimensions and the age at which individuals left full-time education. On average, people with a preference for Intuition left education approximately nine months later than those with a preference for Sensing.

Work area

Previous research into MBTI type suggests that an individual's type influences their choice of career (Hammer, 1998), and indeed there is often found to be a statistically significant relationship between MBTI dimensions and job type. However, at this stage, for the data we have collected there are insufficient numbers of people in each work area category for the analyses to be conducted. This work will be conducted when more data become available.

Nationality

For the OPPassessment group, information on nationality was available. Ninety-seven per cent of the group were Finnish, with the remaining 3% split amongst other European nationalities. No other nationality was represented in sufficiently large numbers for an analysis of type differences by nationality to be conducted.

Employment status

Employment status has often been found to show a relationship with MBTI dimensions in other language versions. However, amongst the

[10] $\chi^2=13.39$; significant at $p<0.001$.

Finnish sample 98% of the group reported that they worked full-time. There were insufficient numbers of people who worked part-time or were self employed for any group-level analyses to be conducted. When additional data become available it will be possible to conduct this analysis.

Appendix 1: Sample description

Sample 1: Data from OPPassessment (representative Finnish-speaking professional and managerial sample)

This sample consists of 665 individuals who completed the MBTI Step I instrument in Finnish via the OPPassessment system between launch of the Finnish version in May 2007 and mid-2008. Sixty per cent of the respondents were male and 40% were female. Age ranged from 23 to 66 years, with a mean of 38 and a median of 36.

Nationality was disclosed by 82% of respondents. Of these, 97% were Finnish. No other individual nationality was represented in large numbers.

Nationality	Percentage
Finnish	97.4%
Other	2.6%

The majority of the group were in full-time employment:

Employment status	Percentage
Full-time	98.0%
Part-time	1.1%
Self-employed	0.9%

Many of the group were of managerial level or above, although the largest single group was employee level (49.2%):

Occupational level	Percentage
Top level	1.2%
Senior executive	2.6%
Upper middle management	7.1%
Middle management	17.6%
First level management/supervisor	17.2%
Employee	49.2%
Other	5.2%

A range of work areas were represented:

Work area (job type)	Percentage
Research and development	25.8%
IT	19.6%
Science, engineering	10.0%
HR, training, guidance	8.9%
Admin or secretarial	7.9%
Sales, customer service	7.4%
Finance	3.6%
Skilled operative	1.4%
Business services	1.2%
Education	0.5%
Land, sea or air transport	0.2%
Other private sector	7.2%
Other public sector	0.7%
Other	5.5%

MBTI® Step I instrument

European Data Supplement

French

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Contents

Introduction

Data from four different samples were analysed to produce the findings in this chapter. A brief description of each sample is given below. Further details of the samples are provided in Appendix 1.

- A group of 8,038 individuals who completed the MBTI Step I questionnaire in French via the OPPassessment system between 2004 and mid-2008.[1] This sample is considered to be representative of the groups of people with whom the French MBTI instrument has been and will be used for applications such as management development, coaching, counselling and teambuilding. As such, it is likely to represent a cross-section of the European French-speaking professional and managerial population.

- A sample of 263 French participants on management development programmes at Ashridge Business School, run between 2000 and 2003.[2]

- A sample of 612 delegates on MBTI qualifying training workshops held in France from January 2002 to March 2005.

- A group of 363 business studies students from two centres (Lille and Nice) who completed the MBTI questionnaire for research purposes and as part of their own development.

The results of the analyses are outlined below.

[1] OPPassessment allows personality questionnaires such as the MBTI instrument to be administered via email and/or completed online.
[2] Data reproduced with kind permission from Ashridge Business School.

Type distribution

Type tables are a way of illustrating the proportion of each type within a particular group. Below are type tables for the three French samples described on the previous page.

For each of the 16 different types, the number of cases, the percentage of the total that this represents and the self-selection ratio (SSR) are shown. The SSR (Myers et al., 1998) is a way of demonstrating whether a given type appears more or less often in a particular group than would be expected given its frequency in a reference group. An SSR of greater than 1 indicates that a type is over-represented, and an SSR of less than 1 denotes that it is under-represented. Asterisks are used to denote whether the over- or under-representations are statistically significant, based on the results of chi-square analysis.[3]

Ideally, the type distribution from a large representative sample of the French population would be used to calculate SSRs in this data supplement. However, such a sample does not currently exist. In its place, SSRs have been calculated using type data from the UK general population (Kendall, 1998), which can be justified by the fact that type distributions for comparable French and British groups, such as managers and professionals, are similar. Evidence (eg Hackston and Kendall, 2004; Quenk et al., 2004; Kirby, Kendall and Barger, 2007) does suggest that although type-related behaviours vary a good deal from country to country and from culture to culture, the frequencies of underlying MBTI types do not.

[3] Chi-square analysis (often abbreviated to χ^2) is a technique used to explore whether observed frequency distributions differ significantly from other, predefined, distributions. In this case, the UK general population group is used as the reference group, and the chi-square analysis indicates whether the proportion of people of each type within a particular sample differs significantly from the proportion of people reporting the same type within the reference group.

OPPassessment data (representative French-speaking professional and managerial sample)

Table 6.1: Type table for OPPassessment data (reported type, n=8,038)

ISTJ	ISFJ	INFJ	INTJ
n=1010 12.6% SSR=0.92	n=314 3.9% SSR=0.31**	n=149 1.9% SSR=1.08	n=359 4.5% SSR=3.17**
ISTP	**ISFP**	**INFP**	**INTP**
n=292 3.6% SSR=0.57**	n=133 1.7% SSR=0.27**	n=222 2.8% SSR=0.87	n=380 4.7% SSR=1.93**
ESTP	**ESFP**	**ENFP**	**ENTP**
n=446 5.5% SSR=0.95	n=292 3.6% SSR=0.42**	n=447 5.6% SSR=0.88	n=563 7.0% SSR=2.54**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=1724 21.4% SSR=2.06**	n=559 7.0% SSR=0.55**	n=326 4.1% SSR=1.47*	n=822 10.2% SSR=3.48**

Type	n	%
E	5179	64.4%**
I	2859	35.6%**
S	4770	59.3%**
N	3268	40.7%**
T	5596	69.6%**
F	2442	30.4%**
J	5263	65.5%*
P	2775	34.5%*

*Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

The most common single type preference is ESTJ (21% of the total); this is a common finding with managerial groups in other countries. The SSR results suggest that, in comparison with the UK general population, those with preferences for NT are over-represented, and those with preferences for SF are under-represented. Again, this is a common finding with managerial groups.

Management development programme participants

Table 6.2: Type table for management development programme participants (reported type, n=263)

ISTJ	ISFJ	INFJ	INTJ
n=44 16.7% SSR=1.22	n=6 2.3% SSR=0.18**	n=2 0.8% SSR=0.44	n=29 11.0% SSR=7.83**
ISTP	**ISFP**	**INFP**	**INTP**
n=8 3.0% SSR=0.47*	n=3 1.1% SSR=0.19**	n=9 3.4% SSR=1.08	n=7 2.7% SSR=1.09
ESTP	**ESFP**	**ENFP**	**ENTP**
n=20 7.6% SSR=1.31	n=5 1.9% SSR=0.22**	n=17 6.5% SSR=1.03	n=19 7.2% SSR=2.62**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=54 20.5% SSR=1.97**	n=12 4.6% SSR=0.36**	n=11 4.2% SSR=1.52	n=17 6.5% SSR=2.20**

Type	n	%
E	155	58.9%*
I	108	41.1%*
S	152	57.8%**
N	111	42.2%**
T	198	75.3%**
F	65	24.7%**
J	175	66.5%*
P	88	33.5%*

*Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

The type distribution is similar to that for the OPPassessment sample described earlier, with ESTJ (21% of the total) being the most common single type preference, and NT being over-represented and SF being under-represented.

MBTI qualifying training course delegates

Reported type and best-fit type results from the MBTI instrument were available for almost the entire sample. In the remaining cases, either best-fit or reported type was provided.

Table 6.3: Type tables for training course delegates

Reported type (n=597)

ISTJ	ISFJ	INFJ	INTJ
n=30 5.0% SSR=0.36**	n=22 3.7% SSR=0.29**	n=36 6.0% SSR=3.53**	n=35 5.9% SSR=4.21**
ISTP	**ISFP**	**INFP**	**INTP**
n=4 0.7% SSR=0.11**	n=8 1.3% SSR=0.21**	n=76 12.7% SSR=3.97**	n=37 6.2% SSR=2.58**
ESTP	**ESFP**	**ENFP**	**ENTP**
n=22 3.7% SSR=0.64*	n=26 4.4% SSR=0.51**	n=106 17.8% SSR=2.83**	n=35 5.9% SSR=2.11**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=35 5.9% SSR=0.57**	n=40 6.7% SSR=0.53**	n=54 9.0% SSR=3.21**	n=31 5.2% SSR=1.79**

Type	n	%
E	349	58.5%**
I	248	41.5%**
S	187	31.3%**
N	410	68.7%**
T	229	38.4%**
F	368	61.6%**
J	283	47.4%**
P	314	52.6%**

Best-fit type (n=578)

ISTJ	ISFJ	INFJ	INTJ
n=20 3.5% SSR=0.26**	n=26 4.5% SSR=0.35**	n=40 6.9% SSR=4.06**	n=35 6.1% SSR=4.36**
ISTP	**ISFP**	**INFP**	**INTP**
n=7 1.2% SSR=0.19**	n=15 2.6% SSR=0.43**	n=88 15.2% SSR=4.75**	n=35 6.1% SSR=2.54**
ESTP	**ESFP**	**ENFP**	**ENTP**
n=16 2.8% SSR=0.48**	n=26 4.5% SSR=0.52**	n=118 20.4% SSR=3.24**	n=39 6.7% SSR=2.39**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=16 2.8% SSR=0.27**	n=34 5.9% SSR=0.47**	n=44 7.6% SSR=2.71**	n=19 3.3% SSR=1.14

Type	n	%
E	312	54.0%
I	266	46.0%
S	160	27.7%**
N	418	72.3%**
T	187	32.4%**
F	391	67.6%**
J	234	40.5%**
P	344	59.5%**

For both tables above: *Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

The most frequent types are ENFP (20%) and INFP (15%). Overall, the distribution of reported types in the group reveals preferences for Intuition and Feeling and, to a lesser extent, preferences for

Extraversion and Perceiving. These trends are generally slightly more pronounced when best-fit type is examined. Compared with the UK general population, those with a preference for Intuition are particularly over-represented.

Similar results (especially with regard to Intuition) have been found with other groups of MBTI practitioners and MBTI qualifying training course delegates.

Business studies students

Table 6.4: Type tables for business studies students

Reported type (n=363)

ISTJ	ISFJ	INFJ	INTJ
n=23 6.3% SSR=0.46**	n=13 3.6% SSR=0.28**	n=21 5.8% SSR=3.41**	n=19 5.2% SSR=3.71**
ISTP	**ISFP**	**INFP**	**INTP**
n=16 4.4% SSR=0.69	n=12 3.3% SSR=0.54*	n=25 6.9% SSR=2.16**	n=38 10.5% SSR=4.38**
ESTP	**ESFP**	**ENFP**	**ENTP**
n=13 3.6% SSR=0.62	n=12 3.3% SSR=0.38**	n=52 14.3% SSR=2.27**	n=22 6.1% SSR=2.18**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=23 6.3% SSR=0.61*	n=25 6.9% SSR=0.55**	n=29 8.0% SSR=2.86**	n=20 5.5% SSR=1.90*

Type	n	%
E	196	54.0%
I	167	46.0%
S	137	37.7%**
N	226	62.3%**
T	174	47.9%
F	189	52.1%
J	173	47.7%**
P	190	52.3%**

*Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

Best-fit type (n=363)

ISTJ	ISFJ	INFJ	INTJ
n=28 7.7% SSR=0.56**	n=19 5.2% SSR=0.41**	n=20 5.5% SSR=3.24**	n=25 6.9% SSR=4.93**
ISTP	**ISFP**	**INFP**	**INTP**
n=15 4.1% SSR=0.64	n=10 2.8% SSR=0.46*	n=35 9.6% SSR=3.00**	n=30 8.3% SSR=3.46**
ESTP	**ESFP**	**ENFP**	**ENTP**
n=12 3.3% SSR=0.57	n=13 3.6% SSR=0.41**	n=57 15.7% SSR=2.49**	n=22 6.1% SSR=2.18**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=21 5.8% SSR=0.56**	n=23 6.3% SSR=0.50**	n=22 6.1% SSR=2.18**	n=11 3.0% SSR=1.03

Type	n	%
E	181	49.9%
I	182	50.1%
S	141	38.8%**
N	222	61.2%**
T	164	45.2%
F	199	54.8%
J	169	46.6%**
P	194	53.4%**

*Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

For both reported and best-fit type, there is a clear majority of people with preferences for Intuition; ENFP is the most common whole-type preference in both cases. Compared with the UK general population reference group, those with a preference for Intuition are over-represented. This is typical of student groups and of those who have been educated to a higher level (for example, see Casas, 1990; MacDaid et al., 1991).

Internal consistency reliability

The reliability of a test or questionnaire relates to how consistent and precise it is. Internal consistency reliability addresses the question of whether all the questions in a scale measure the same construct. A common measure of internal consistency reliability is coefficient alpha (Cronbach, 1951). The alpha coefficients for the French samples are shown in Table 6.5.

Table 6.5: Internal consistency reliability

Dimension	Coefficient alpha		
	OPPassessment	MBTI qualifying delegates	Business students
E–I	0.84	0.87	0.83
S–N	0.79	0.82	0.74
T–F	0.75	0.79	0.71
J–P	0.80	0.86	0.81

It is generally agreed that internal consistency reliability should achieve a value of at least 0.7 for a test to be considered to be reliable.[4] On this basis, all the dimensions of the questionnaire show good reliability in all groups. In addition, the alpha coefficients have been found to be consistent across different age groups and across males and females.

[4] For example, see Nunnally (1978) or Kline (2000).

Intercorrelations between MBTI dimensions

One of the original aims of developing the MBTI questionnaire was to see if dimensions could be produced that were independent of each other. Results from other language versions have shown that this was achieved with all dimensions except Sensing–Intuition and Judging–Perceiving. This shows up despite the fact that questions were carefully chosen to sort on only one dimension. The author of the questionnaire hypothesised that the S–N/J–P relationship may simply be a reflection of reality rather than a failing in the construction of the questionnaire.

The intercorrelations between dimensions amongst the OPPassessment sample are shown in Table 6.6. In order to be able to calculate the correlations, scores on each dimension were converted to continuous scores.[5]

Table 6.6: Intercorrelations between dimensions

	E–I	S–N	T–F	J–P
E–I		–0.05**	–0.08**	0.01
S–N			0.14**	0.38**
T–F				0.25**
J–P				

**Significant at p<0.01.

Although statistically significant, only very low correlations were found between most of the dimensions. The S–N/J–P relationship that has been found with other language versions has been replicated, showing that a preference for Sensing is likely to be associated with a preference for Judging, and that a preference for Intuition is likely to be associated with a preference for Perceiving. A smaller, but notable, correlation was also found between T–F and J–P. A preference for Thinking is likely to be associated with a preference for Judging, and a preference for Feeling is likely to be associated with a preference for Perceiving.

[5] Continuous scores (Myers and McCaulley, 1985, p. 9) place an individual's score on each dimension onto a continuous scale with a mid-point of 100. To calculate continuous scores, Preference Clarity Index (PCI) scores for each dimension are either subtracted or added to 100, depending on which direction the overall preference is. PCI scores in the direction of E, S, T or J are subtracted from 100. PCI scores in the direction of I, N, F or P are added to 100.

Best-fit validity: the accuracy of the French MBTI Step I instrument in predicting best-fit type

The purpose of the MBTI instrument is to help individuals to establish their validated or 'best-fit' psychological type. A key measure of the validity of the instrument is, therefore, how well the results relate to best-fit (validated) type. These data are useful to practitioners in knowing how typically accurate the reported result is likely to be.

Best-fit data are available for two of the samples. The business studies students were given group feedback on their results, and best-fit type data were collected alongside reported type results. The MBTI qualifying workshop delegates established their best-fit type as part of their training course, and this was collected for almost the entire sample (578 people).

Table 6.7 presents the results of the analysis comparing reported with best-fit type. The French MBTI Step I questionnaire performs in a very similar way to other European language versions, and there is very good evidence for the accuracy of the instrument. In between 60% and 70% of cases, a respondent's reported type will match their best-fit type, and in 93% of cases at least three of the four preferences will match.

Table 6.7: Match of reported and best-fit type

	MBTI qualifying training course delegates (n=578)		Business studies (n=363)	
Agrees with all four letters	67.8%	93.1%	62.3%	93.4%
Agrees with three letters	25.3%		31.1%	
Agrees with two letters	6.1%	6.9%	4.9%	6.6%
Agrees with one letter	0.7%		1.7%	
Agrees with no letters	0.2%		0.0%	

	Percentage agreement	
Dimension	Training delegates	Business studies
E–I	90.1%	89.8%
S–N	91.0%	91.6%
T–F	88.3%	86.8%
J–P	90.6%	86.8%

Two further analyses were carried out to investigate the validity and accuracy of the questionnaire. Firstly, MBTI qualifying training course delegates were asked how confident they felt about each of their best-fit preferences (on a scale of 1 to 5, where 5 indicated the highest degree of confidence). For every dimension, over 80% of the group reported a rating of either 4 or 5, showing they were confident about

their type, providing further support for the validity of the MBTI approach. Detailed results are shown in Table 6.8.

Table 6.8: Degree of confidence in results

Degree of confidence	Percentage of group			
	E–I	S–N	T–F	J–P
5 (highest)	65%	61%	58%	63%
4	19%	23%	23%	22%
3	11%	10%	14%	10%
2	5%	4%	3%	3%
1 (lowest)	1%	2%	2%	2%
% at 4 or above	*84%*	*84%*	*81%*	*85%*

Secondly, item-level data from the business students sample were used to re-calculate prediction ratios for each item. From these prediction ratios, revised item weightings were derived,[6] which were then applied to the data to produce revised reported types for each person. Each person's reported type was then compared with their best-fit type. The results showed no improvement over the level of agreement achieved using the existing Step I item weightings, and a high level of agreement between the new weightings and the standard Step I item weightings, which were applied across all Step I European language versions. There was therefore no evidence to suggest that a different scoring system should be applied to the MBTI Step I instrument in France.

In summary, there is good evidence for the validity of the French MBTI Step I instrument. Specifically:

- There is a high level of agreement between best-fit and reported type, as high as for the English language version.
- Respondents are overwhelmingly confident about their results.
- There is no evidence that a scoring algorithm specifically for the French version would improve the accuracy of the instrument.

[6] For a description of how prediction ratios are derived and then used to devise scoring weights, see Myers and McCaulley (1985, pp. 146–7).

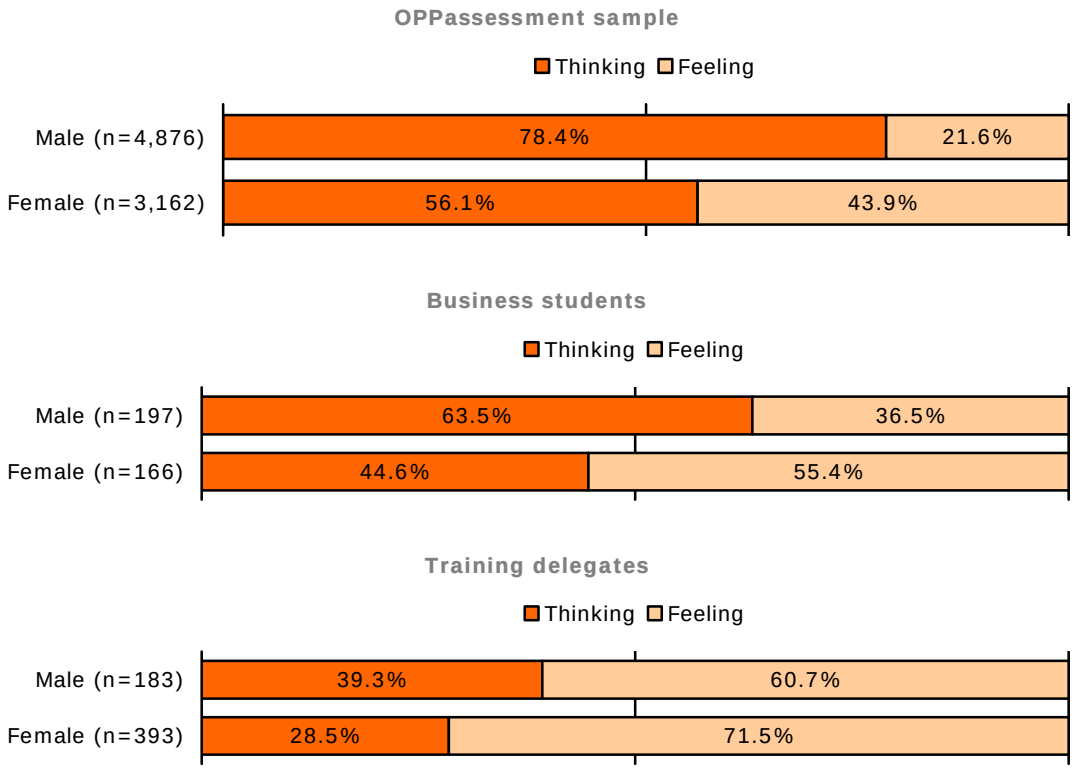
Group differences in type

Across three of the four samples, a variety of different demographic information was collected. The relationship of MBTI type to each of these factors is described below.

Gender

Across countries, most groups who complete the MBTI questionnaire show a significant gender difference on the Thinking–Feeling dimension, and this is the case for the three groups in this study, as shown in Figure 6.1.[7]

Figure 6.1: Gender differences on the T–F dimension



When compared with the T–F distribution in the combined sample, Thinking preferences are over-represented amongst men and Feeling preferences are over-represented amongst women across the groups. This effect has been found many times with many different language versions of the instrument in a number of different cultures. It is also worth noting from these data that the distributions vary widely across groups, with the OPPassessment sample tending towards a preference

[7] OPPassessment sample: $\chi^2=452.29$; significant at $p<0.001$. Business students: $\chi^2=12.96$; significant at $p<0.001$. Training delegates: $\chi^2=6.76$; significant at $p<0.01$.

for Thinking for both men and women, and the training delegates tending towards a preference for Feeling for both men and women.

Age

Previous research using UK Step I continuous scores has shown significant correlations between age and three of the four dimensions (Warr, Miles and Platts, 2001). Older people were more likely than younger people to have preferences for Introversion, Sensing and Judging.

The data in this supplement were analysed in a slightly different way, by looking for differences in average age between people with preferences for Extraversion versus those with preferences for Introversion, for Sensing versus Intuition, for Thinking versus Feeling and for Judging versus Perceiving. However, none of the French samples showed a statistically significant and meaningful relationship between type and age.

Occupational level

Previous research in other countries has demonstrated that individuals in higher level jobs in organisations are more likely to have preferences for Intuition and for Thinking than those in lower level jobs (Quenk, Hammer and Majors, 2004).

The same relationship between Intuition and Thinking and occupational level was found in the OPPassessment sample. Those with preferences for Intuition and Thinking are over-represented at a higher level, as shown in Figures 6.2 and 6.3.

Figure 6.2: Sensing–Intuition[8] and occupational level (OPPassessment data)

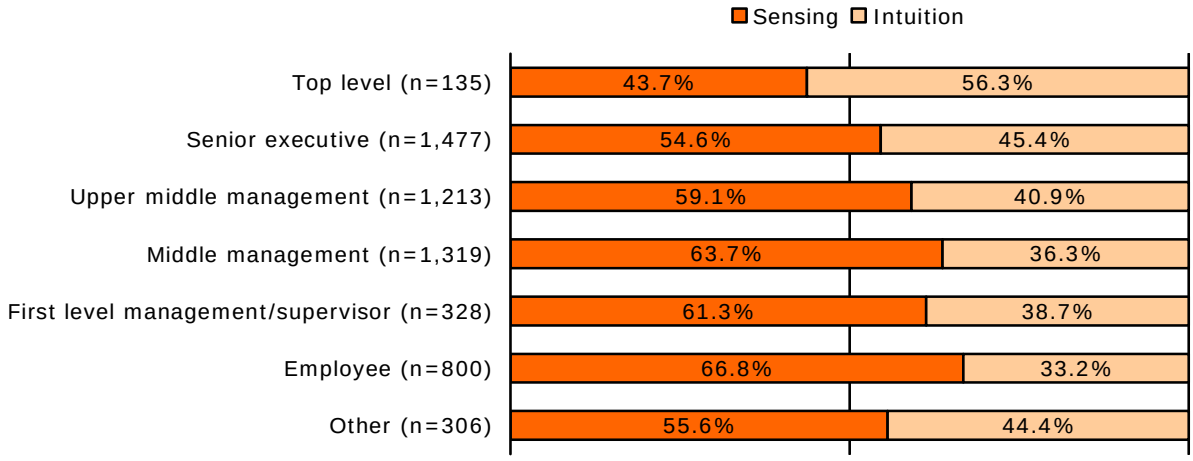
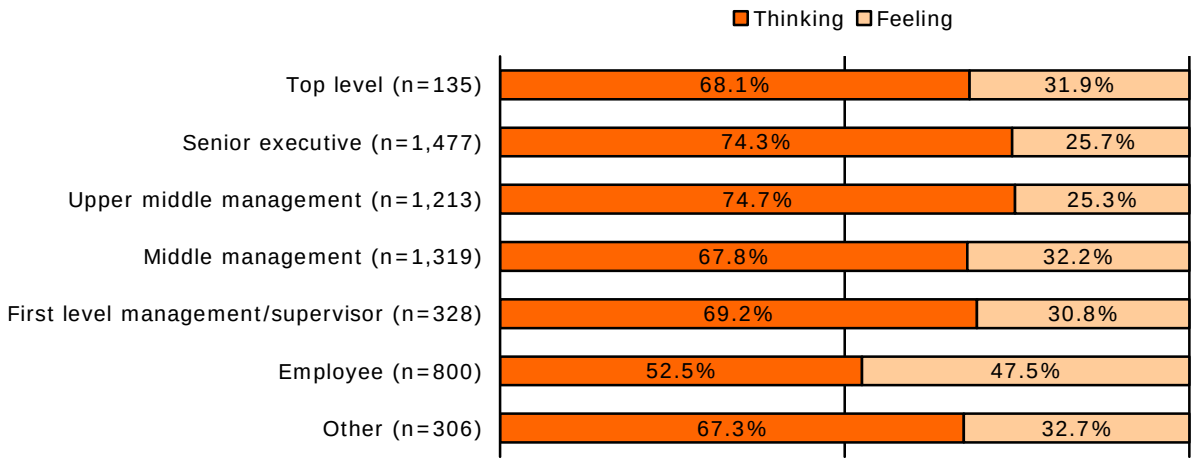


Figure 6.3: Thinking–Feeling[9] and occupational level (OPPassessment data)

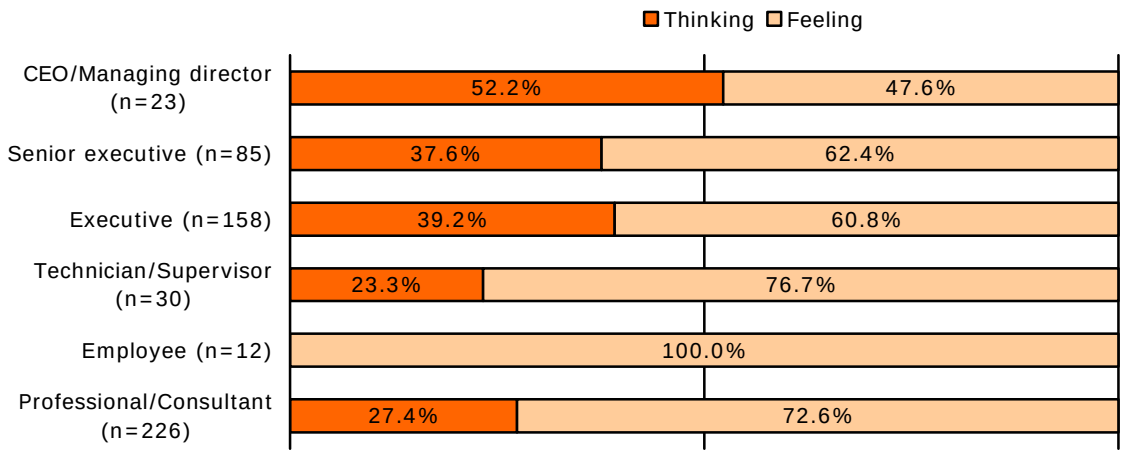


Note also that in this data set as a whole, preferences for Intuition and Thinking are over-represented in comparison with the (UK) general population.

In the MBTI qualifying training sample, a relationship only between Thinking and occupational level was found (Figure 6.4).

[8] χ^2=58.00; significant at p<0.001.
[9] χ^2=140.42; significant at p<0.001.

Figure 6.4: Thinking–Feeling and occupational level[10] (MBTI qualifying training course delegates)



Education

Specific educational qualifications were not collected for the OPPassessment sample; however, the age at which individuals left full-time education was. Those who left full-time education at an older age were significantly more likely to have preferences for Intuition,[11] Thinking[12] and Perceiving.[13] However, whilst statistically significant, the differences were very small in real terms.

The MBTI qualifying training course delegate data show a small but statistically significant tendency[14] for those at an educational level of Bac +5 (ie five years of higher education after obtaining the Baccalauréat qualification) and above to be more likely to have a Perceiving preference than those at the Bac +3 and +4 level.

Analysis by education level was not carried out for the business student sample.

Work area

Previous research into MBTI type suggests that an individual's type influences their choice of career (Hammer, 1998), and indeed the data in this chapter show that there is a statistically significant relationship between each dimension and work area. In the figures that follow, categories have been re-ordered according to the percentage of E, S, T

[10] $\chi^2=24.39$; significant at $p<0.01$. Note: in this figure only those roles with a total sample of ten or more are shown.
[11] Independent-samples t-test; $t=-3.884$, significant at $p<0.001$.
[12] Independent-samples t-test; $t=-4.659$, significant at $p<0.001$.
[13] Independent-samples t-test; $t=-2.464$, significant at $p<0.05$.
[14] $\chi^2=11.23$; df=5, significant at $p<0.05$.

or J, and work areas with fewer than 100 respondents have been omitted (as well as undefined work areas such as 'Other').

Figure 6.5: Extraversion–Introversion[15] and work area

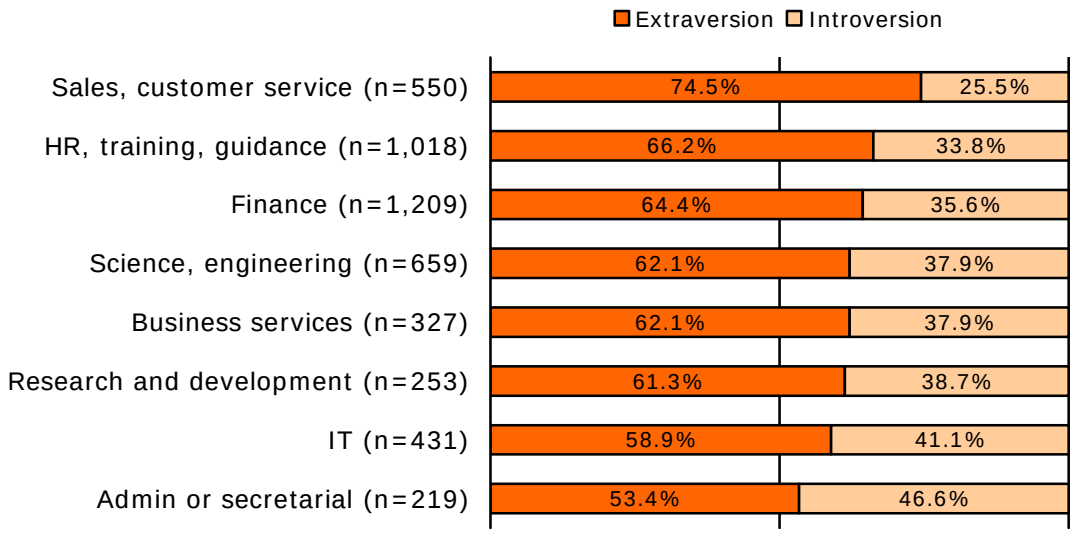
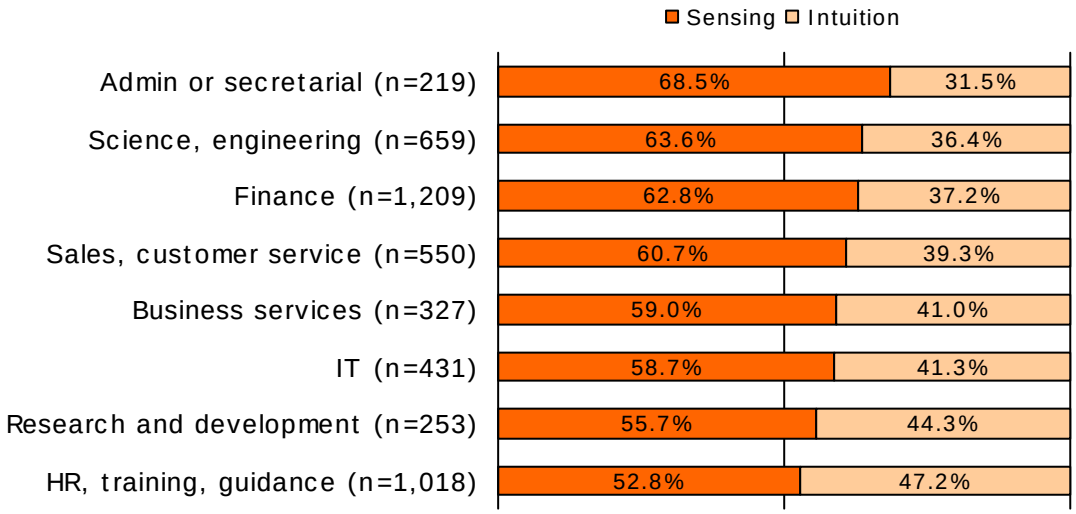


Figure 6.6: Sensing–Intuition[16] and work area



[15] $\chi^2=55.85$; significant at $p<0.001$.
[16] $\chi^2=62.07$; significant at $p<0.001$.

Figure 6.7: Thinking–Feeling[17] and work area

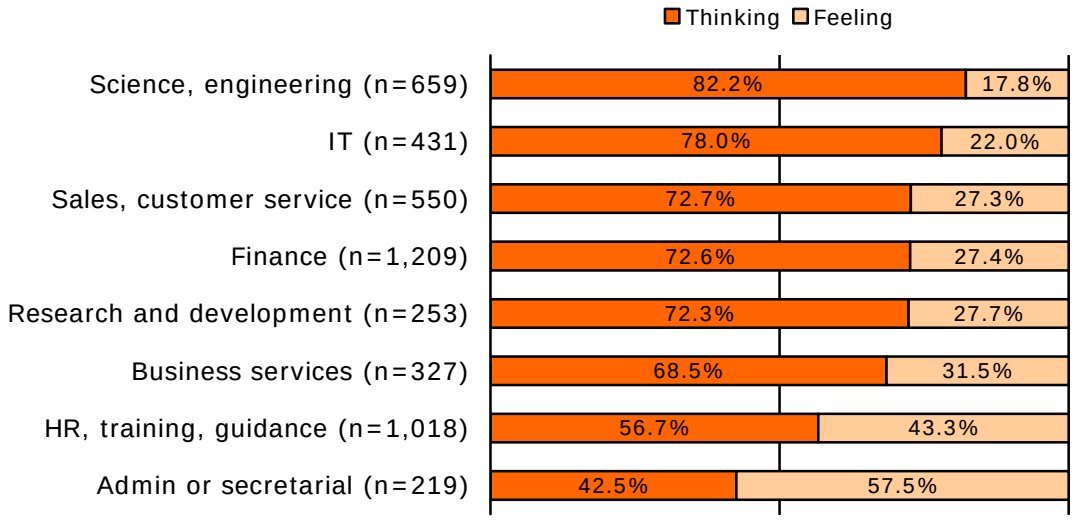
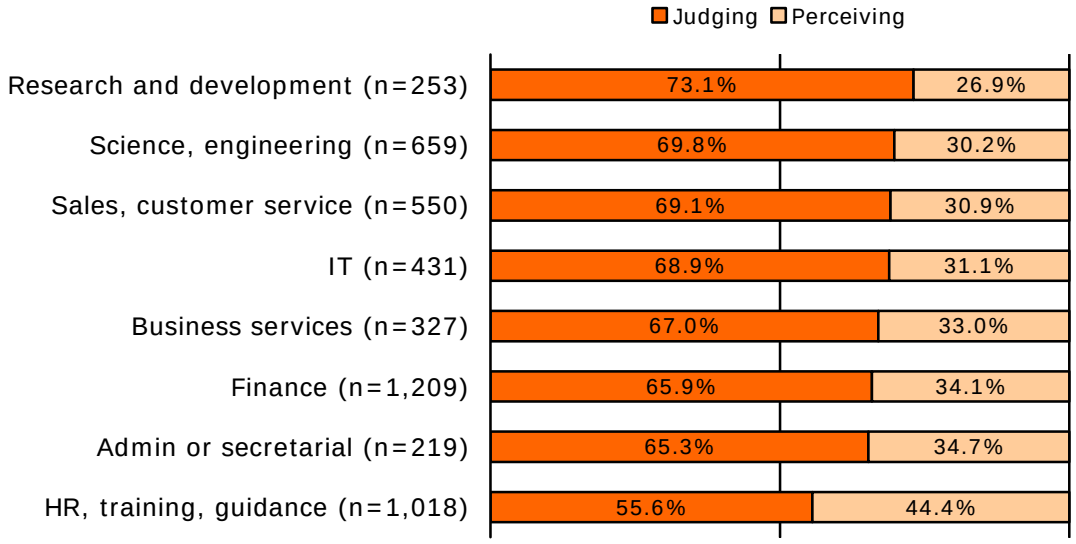


Figure 6.8: Judging–Perceiving[18] and work area



[17] $\chi^2=243.53$; significant at $p<0.001$.
[18] $\chi^2=75.62$; significant at $p<0.001$.

Nationality

Information on nationality was available for the OPPassessment group. Although two-thirds of the group were French, two other nationalities (Belgian and Swiss) were also represented in large numbers (see Appendix 1 for details). Type tables for the three main nationalities are shown below, along with a table summarising the differences. Analysis suggested that the Belgian sub-group was significantly more likely[19] to have a Sensing preference than the French group, and that the French group were significantly more likely to have a Thinking preference than the Belgian[20] and Swiss[21] sub-groups.

Table 6.9: Type table for French respondents (reported type, n=3,933)

ISTJ	ISFJ	INFJ	INTJ
n=466 11.8% SSR=0.86	n=144 3.7% SSR=0.29**	n=93 2.4% SSR=1.38	n=176 4.5% SSR=3.18**
ISTP	**ISFP**	**INFP**	**INTP**
n=156 4.0% SSR=0.62**	n=57 1.4% SSR=0.24**	n=112 2.8% SSR=0.89	n=198 5.0% SSR=2.06**
ESTP	**ESFP**	**ENFP**	**ENTP**
n=221 5.6% SSR=0.97	n=152 3.9% SSR=0.44**	n=208 5.3% SSR=0.84	n=308 7.8% SSR=2.84**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=790 20.1% SSR=1.93**	n=265 6.7% SSR=0.53**	n=154 3.9% SSR=1.42*	n=433 11.0% SSR=3.75**

Type	n	%
E	5,179	64.4%**
I	2,859	35.6%**
S	4,770	59.3%**
N	3,268	40.7%**
T	5,596	69.6%**
F	2,442	30.4%**
J	5,263	65.5%*
P	2,775	34.5%*

*Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

[19] χ^2=11.72; significant at p<0.001.
[20] χ^2=7.28; significant at p<0.01.
[21] χ^2=19.27; significant at p<0.001.

Table 6.10: Type table for Belgian French-speaking respondents (reported type, n=898)

ISTJ	ISFJ	INFJ	INTJ
n=117 13.0% SSR=0.95	n=32 3.6% SSR=0.28**	n=13 1.4% SSR=0.84	n=36 4.0% SSR=2.85**
ISTP	**ISFP**	**INFP**	**INTP**
n=33 3.7% SSR=0.57**	n=14 1.6% SSR=0.25**	n=24 2.7% SSR=0.84	n=36 4.0% SSR=1.64*
ESTP	**ESFP**	**ENFP**	**ENTP**
n=47 5.2% SSR=0.90	n=44 4.9% SSR=0.56**	n=52 5.8% SSR=0.92	n=67 7.5% SSR=2.71**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=192 21.4% SSR=2.06**	n=91 10.1% SSR=0.80	n=42 4.7% SSR=1.70*	n=58 6.5% SSR=2.20**

Type	n	%
E	593	66.0%**
I	305	34.0%**
S	570	63.5%**
N	328	36.5%**
T	586	65.3%**
F	312	34.7%**
J	581	64.7%**
P	317	35.3%**

*Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

Table 6.11: Type table for Swiss French-speaking respondents (reported type, n=534)

ISTJ	ISFJ	INFJ	INTJ
n=59 11.0% SSR=0.81	n=34 6.4% SSR=0.50**	n=4 0.7% SSR=0.44	n=16 3.0% SSR=2.13*
ISTP	**ISFP**	**INFP**	**INTP**
n=20 3.7% SSR=0.58*	n=10 1.9% SSR=0.31**	n=14 2.6% SSR=0.82	n=29 5.4% SSR=2.22**
ESTP	**ESFP**	**ENFP**	**ENTP**
n=32 6.0% SSR=1.03	n=24 4.5% SSR=0.52**	n=47 8.8% SSR=1.40*	n=34 6.4% SSR=2.31**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=89 16.7% SSR=1.60**	n=48 9.0% SSR=0.71*	n=30 5.6% SSR=2.04*	n=44 8.2% SSR=2.80**

Type	n	%
E	348	65.2%**
I	186	34.8%**
S	316	59.2%**
N	218	40.8%**
T	323	60.5%**
F	211	39.5%**
J	324	60.7%
P	210	39.3%

*Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

Table 6.12: Summary of differences by nationality

	E	I	S	N	T	F	J	P
French (n=3,933)	64%	36%	59%	41%	70%	30%	65%	35%
Belgian (n=898)	66%	34%	63%	37%	65%	35%	65%	35%
Swiss (n=534)	65%	35%	59%	41%	60%	40%	61%	39%

Employment status

Employment status (available for the OPPassessment sample) showed a relationship with the Sensing–Intuition and Thinking–Feeling dimensions. Those who were self-employed were more likely than other groups to have a preference for Intuition,[22] and those who worked part-time were more likely than other groups to have a preference for Feeling.[23] This is likely to be a gender effect; 89% of part-time workers were female, compared with 38% of the total group and 35% of full-time workers.

[22] χ^2=24.26; significant at p<0.001.
[23] χ^2=113.95; significant at p<0.001.

Appendix 1: Sample descriptions

Sample 1: Data from OPPassessment (representative French-speaking professional and managerial sample)

This sample consisted of 8,038 individuals who completed the MBTI Step I questionnaire in French via the OPPassessment system between January 2004 and June 2008. Sixty-one per cent of the respondents were male and 39% were female. Age ranged from 16 to 71 years, with a mean and median of 37.

Nationality was disclosed by 74% of respondents, two-thirds of whom were French:

Nationality	Percentage
French	65.7%
Belgian	15.0%
Swiss	8.9%
Italian	1.2%
Other	9.2%

The majority of the group were in full-time employment:

Employment status	Percentage
Full-time	91.2%
Part-time	5.5%
Self-employed	2.0%
Unemployed	1.1%
Retired	0.1%
Homemaker	0.1%

The majority of the group were of managerial level or above:

Occupational level	Percentage
Top level	2.4%
Senior executive	26.5%
Upper middle management	21.7%
Middle management	23.6%
First level management/supervisor	5.9%
Employee	14.3%
Other	5.5%

A range of work areas were represented:

Work area (job type)	Percentage
Finance	21.6%
HR, training, guidance	18.2%
Science, engineering	11.8%
Sales, customer service	9.8%
IT	7.7%
Business services	5.8%
Research and development	4.5%
Admin or secretarial	3.9%
Health, social services, etc.	1.1%
Skilled operative	0.8%
Land, sea or air transport	0.7%
Education	0.5%
Leisure, personal service	0.4%
Military, police, prison, fire	0.2%
Unskilled operative	<0.1%
Other	7.4%
Other private sector	5.0%
Other public sector	0.7%

Sample 2: Management development programme participants

The sample consisted of 263 French participants on management development programmes at Ashridge Business School, run between 2000 and 2003. Eighty-four per cent of the group were male and 16% female. Age ranged from 26 to 58 years.

Sample 3: Delegates on French MBTI qualifying training courses

The sample consisted of 612 delegates on French MBTI training programmes from January 2002 to March 2005. Of this group, 416 (69%) were female and 189 (31%) male; age ranged from 24 to 63 years (with an average age of 42). The majority (563 people, 96% of those who answered the question) said that overall they were satisfied with their job.

Most of the sample group (570 people, 93%) provided information on their job role; the majority categorised themselves as professionals/consultants (41%) or as managers or executives (49%):

Job role	n	%
CEO/Managing director	26	4.6
Managing executive	85	14.9
Executive	167	29.3
Technician/Supervisor	32	5.6
Employee	14	2.5
Skilled worker	0	0
Professional/Consultant	234	41.1
Student	1	0.2
Retired/Volunteer	2	0.4
Job-seeker	1	0.2
Craftsman/Retailer	2	0.4
Farmer	0	0
Unemployed	6	1.1

Just under three-quarters of the sample (445 people, 73%) also provided information on their area of work. Not surprisingly, most of these were in training and development (66%) or HR (21%):

Area of work	n	%
Top level management	27	6.1
Production	7	1.6
Purchasing	2	0.4
Sales/Marketing	8	1.8
Education/R&D	6	1.3
Administration/Legal	1	0.2
Finance	1	0.2
Accounting	1	0.2
IT	4	0.9
Management	93	20.9
HR/Training/Development	295	66.3

Almost all the sample (604 people, 99%) provided their educational background:[24]

Level of education	n	%
CAP/BEP	1	0.2
< Bac	5	0.8
Bac	7	1.2
Bac + 1 & 2	31	5.1
Bac + 3 & 4	148	24.5
Bac + 5 and above	412	68.2

Sample 4: Business studies students

The sample consisted of 363 business studies students. Of these, 197 (54%) were female and 166 (46%) were male. Age ranged from 18 to 22 years, with a mean of 20 years.

[24] CAP: the certificat d'aptitude professionnelle is a vocational training qualification. BEP: the brevet d'études professionnelles is a certificate of professional education. Bac: the Baccalauréat is the examination taken before leaving school, usually at the age of 17 or 18. Bac +: the number of years of higher education after having obtained the Baccalauréat.

MBTI® Step I instrument

European Data Supplement

German

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Contents

Introduction

Data from five different samples were analysed to produce the findings in this supplement. A brief description of each sample is given below. Further details of the samples are provided in Appendix 1.

- A group of 11,515 individuals who completed the MBTI Step I questionnaire in German via the OPPassessment system between 2004 and mid-2008.[1] This sample is considered to be representative of the groups of people with whom the German MBTI instrument has been and will be used for applications such as management development, coaching, counselling and teambuilding. As such, it is likely to represent a cross-section of the German-speaking professional and managerial population.

- A group of 228 individuals who completed a trial version of the MBTI questionnaire as part of the development of the Step II instrument. This sample was designed to be representative of the German general population.

- A sample of 687 German participants on management development programmes at Ashridge Business School, run between 2000 and 2003.[2]

- A sample of 323 delegates on MBTI qualifying training workshops held in Germany between 2002 and 2006.

- A group of 110 MBTI practitioners who took part in a research study to look at the relationship between MBTI reported type and best-fit type.

The results of the analyses are outlined below.

[1] OPPassessment allows personality questionnaires such as the MBTI instrument to be administered via email and/or completed online.
[2] Data reproduced with kind permission from Ashridge Business School.

Type distribution

Type tables are a way of illustrating the proportion of each type within a particular group. Below are type tables for the three German samples described above.

For each of the 16 different types, the number of cases, the percentage of the total that this represents and the self-selection ratio (SSR) are shown. The SSR (Myers et al., 1998) is a way of demonstrating whether a given type appears more or less often in a particular group than would be expected given its frequency in a reference group. An SSR of greater than 1 indicates that a type is over-represented, and an SSR of less than 1 denotes that it is under-represented. Asterisks are used to denote whether the over- or under-representations are statistically significant, based on the results of chi-square analysis.[3]

Ideally the type distribution from a large representative sample of the German population would be used to calculate SSRs in this data supplement. However, such a sample does not currently exist. In its place, SSRs have been calculated using type data from the UK general population (Kendall, 1998), which can be justified by the fact that type distributions for comparable German and British groups, such as managers and professionals, are similar. Evidence (eg Hackston and Kendall, 2004; Quenk et al., 2004; Kirby, Kendall and Barger, 2007) does suggest that although type-related behaviours vary a good deal from country to country and from culture to culture, the frequencies of underlying MBTI types do not.

[3] Chi-square analysis (often abbreviated to χ^2) is a technique used to explore whether observed frequency distributions differ significantly from other, predefined, distributions. In this case, the UK general population group is used as the reference group, and the chi-square analysis indicates whether the proportion of people of each type within a particular sample differs significantly from the proportion of people reporting the same type within the reference group.

OPPassessment data (representative German-speaking professional and managerial sample)

Table 7.1: Type table for OPPassessment data (reported type, n=11,515)

ISTJ	ISFJ	INFJ	INTJ
n=1,431 12.4% SSR=0.91	n=201 1.7% SSR=0.14**	n=125 1.1% SSR=0.63*	n=641 5.6% SSR=3.95**
ISTP	**ISFP**	**INFP**	**INTP**
n=316 2.7% SSR=0.43**	n=79 0.7% SSR=0.11**	n=125 1.1% SSR=0.34**	n=357 3.1% SSR=1.27
ESTP	**ESFP**	**ENFP**	**ENTP**
n=584 5.1% SSR=0.87	n=194 1.7% SSR=0.19**	n=417 3.6% SSR=0.57**	n=998 8.7% SSR=3.15**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=2,858 24.8% SSR=2.39**	n=568 4.9% SSR=0.39**	n=518 4.5% SSR=1.63**	n=2,103 18.3% SSR=6.22**

Type	n	%
E	8,240	71.6%**
I	3,275	28.4%**
S	6,231	54.1%**
N	5,284	45.9%**
T	9,288	80.7%**
F	2,227	19.3%**
J	8,445	73.3%**
P	3,070	26.7%**

*Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

The most common single type preference is ESTJ (25% of the total); this is a common finding with managerial groups in other countries. The SSR results suggest that, in comparison with the UK general population, those with preferences for NT are over-represented, and those with preferences for SF are under-represented. Again, this is a common finding with managerial groups.

General population sample

Table 7.2: Type table for German general population sample (n=228)

ISTJ	ISFJ	INFJ	INTJ
n=36 15.8% SSR=1.15	n=9 3.9% SSR=0.31**	n=5 2.2% SSR=1.29	n=9 3.9% SSR=2.79**
ISTP	**ISFP**	**INFP**	**INTP**
n=17 7.5% SSR=1.17	n=7 3.1% SSR=0.51	n=15 6.6% SSR=2.06**	n=14 6.1% SSR=2.54**
ESTP	**ESFP**	**ENFP**	**ENTP**
n=12 5.3% SSR=0.91	n=2 0.9% SSR=0.10**	n=18 7.9% SSR=1.25	n=21 9.2% SSR=3.29**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=32 14.0% SSR=1.35	n=8 3.5% SSR=0.28**	n=10 4.4% SSR=1.57	n=13 5.7% SSR=1.97*

Type	n	%
E	116	50.9%
I	112	49.1%
S	123	53.9%**
N	105	46.1%**
T	154	67.5%**
F	74	32.5%**
J	122	53.5%
P	106	46.5%

*Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

The most common single type preference amongst this sample is ISTJ (16% of the total), closely followed by ESTJ (14%). ISTJ is also the most common single type preference amongst the UK general population sample (14%), with ESTJ being the fourth most common (10%). Interestingly, ISFJ and ESFJ are considerably less common amongst this German sample (both 4%) than they are amongst the UK population sample (both 13%).

Overall, the SSR results suggest that, in comparison with the UK general population, those with preferences for NT are over-represented, and those with preferences for SF are under-represented. However, the reader should bear in mind that the German sample is considerably smaller than the UK sample, and therefore these findings should be treated with caution.

Management development programme participants

Table 7.3: Type table for management development programme participants (reported type, n=687)

ISTJ	ISFJ	INFJ	INTJ
n=83 12.1% SSR=0.88	n=3 0.4% SSR=0.03**	n=2 0.3% SSR=0.17**	n=36 5.2% SSR=3.72**
ISTP	**ISFP**	**INFP**	**INTP**
n=25 3.6% SSR=0.57**	n=2 0.3% SSR=0.05**	n=11 1.6% SSR=0.50*	n=26 3.8% SSR=1.55
ESTP	**ESFP**	**ENFP**	**ENTP**
n=44 6.4% SSR=1.10	n=4 0.6% SSR=0.07**	n=25 3.6% SSR=0.58*	n=72 10.5% SSR=3.81**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=173 25.2% SSR=2.42**	n=12 1.7% SSR=0.14**	n=30 4.4% SSR=1.59*	n=139 20.2% SSR=6.89**

Type	n	%
E	499	72.6%**
I	188	27.4%**
S	346	50.4%**
N	341	49.6%**
T	598	87.0%**
F	89	13.0%**
J	478	69.6%**
P	209	30.4%**

*Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

The type distribution is similar to that for the OPPassessment sample described earlier, with ESTJ (25% of the total) being the most common single type preference, and NT being over-represented and SF being under-represented.

MBTI qualifying training course delegates

Reported type and best-fit type results from the MBTI instrument were available for almost the entire sample. In the remaining cases, either best-fit or reported type was provided.

Table 7.4: Type tables for training course delegates

Reported type (n=323)

ISTJ	ISFJ	INFJ	INTJ
n=25 7.7% SSR=0.56**	n=15 4.6% SSR=0.36**	n=5 1.5% SSR=0.88	n=29 8.9% SSR=6.36**
ISTP	**ISFP**	**INFP**	**INTP**
n=5 1.5% SSR=0.23**	n=1 0.3% SSR=0.05**	n=9 2.8% SSR=0.88	n=14 4.3% SSR=1.79
ESTP	**ESFP**	**ENFP**	**ENTP**
n=16 4.9% SSR=0.84	n=8 2.5% SSR=0.29**	n=31 9.5% SSR=1.51*	n=33 10.1% SSR=3.61**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=40 12.3% SSR=1.18	n=23 7.1% SSR=.56**	n=29 8.9% SSR=3.18**	n=40 12.3% SSR=4.24**

Type	n	%
E	220	68.1%**
I	103	31.9%**
S	133	41.2%**
N	190	58.8%**
T	202	62.5%**
F	121	37.5%**
J	206	63.8%
P	117	36.2%

Best-fit type (n=323)

ISTJ	ISFJ	INFJ	INTJ
n=31 9.5% SSR=0.69*	n=8 2.5% SSR=0.20**	n=7 2.1% SSR=1.24	n=25 7.7% SSR=5.50**
ISTP	**ISFP**	**INFP**	**INTP**
n=9 2.8% SSR=0.44*	n=4 1.2% SSR=0.20**	n=12 3.7% SSR=1.16	n=9 2.8% SSR=1.17
ESTP	**ESFP**	**ENFP**	**ENTP**
n=11 3.4% SSR=0.59	n=11 3.4% SSR=0.39**	n=38 11.7% SSR=1.86**	n=29 8.9% SSR=3.18**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=47 14.4% SSR=1.38*	n=22 6.7% SSR=0.53**	n=24 7.4% SSR=2.64**	n=36 11.0% SSR=3.79**

Type	n	%
E	218	67.5%**
I	105	32.5%**
S	143	44.3%**
N	180	55.7%**
T	197	61.0%**
F	126	39.0%**
J	200	61.9%
P	123	38.1%

For both tables above: *Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

Looking at reported type, the most frequent type preferences are ENTJ and ESTJ (each 12% of the total). Overall, the distribution of reported type in the group shows preferences for Extraversion, and to a lesser extent for Judging, Thinking and Intuition.

In terms of best-fit type, ESTJ (14%) is the most frequently occurring type preference, followed by ENFP (12%) and ENTJ (11%). The general pattern is very similar to that found with reported type, with the group tending to have a preference for Extraversion, and to a lesser extent for Judging, Thinking and Intuition.

It is known that people often feel pressure to exhibit more of a Thinking style of behaviour in business settings. If this were the case amongst this group we might expect a lower proportion of Thinking types when we look at best-fit type than when we look at reported type. However, such a pattern has not been observed for this group. This contrasts with findings from Dutch and French training delegates, where this pattern has been observed.

Looking at the SSR figures it can be seen that, compared with the UK general population, those with a preference for Intuition are particularly over-represented.

Although not typical of the UK general population, similar results (especially with regard to Extraversion and Intuition) have been found with other groups of MBTI users and training course delegates.

MBTI practitioners

Table 7.5: Type table for MBTI practitioners

Reported type (n=110)

ISTJ	ISFJ	INFJ	INTJ
n=4 3.6% SSR=0.27**	n=2 1.8% SSR=0.14**	n=5 4.5% SSR=2.65*	n=5 4.5% SSR=3.23*
ISTP	**ISFP**	**INFP**	**INTP**
n=1 0.9% SSR=0.14*	n=3 2.7% SSR=0.45	n=9 8.2% SSR=2.57**	n=8 7.3% SSR=2.97**
ESTP	**ESFP**	**ENFP**	**ENTP**
n=4 3.6% SSR=0.63	n=4 3.6% SSR=0.42	n=20 18.2% SSR=2.88**	n=13 11.8% SSR=4.29**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=5 4.5% SSR=0.44*	n=6 5.5% SSR=0.43*	n=5 4.5% SSR=1.65	n=16 14.5% SSR=4.95**

Type	n	%
E	73	66.4%**
I	37	33.6%**
S	29	26.4%**
N	81	73.6%**
T	56	50.9%
F	54	49.1%
J	48	43.6%**
P	62	56.4%**

Best-fit type (n=110)

ISTJ	ISFJ	INFJ	INTJ
n=6 5.5% SSR=0.40*	n=2 1.8% SSR=0.14**	n=4 3.6% SSR=2.12	n=6 5.5% SSR=3.88**
ISTP	**ISFP**	**INFP**	**INTP**
n=3 2.7% SSR=0.42	n=3 2.7% SSR=0.45	n=7 6.4% SSR=2.00	n=5 4.5% SSR=1.86
ESTP	**ESFP**	**ENFP**	**ENTP**
n=4 3.6% SSR=0.63	n=1 0.9% SSR=0.10**	n=23 20.9% SSR=3.32**	n=16 14.5% SSR=5.28**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=6 5.5% SSR=0.52	n=4 3.6% SSR=0.29**	n=8 7.3% SSR=2.64**	n=12 10.9% SSR=3.71**

Type	n	%
E	74	67.3%**
I	36	32.7%**
S	29	26.4%**
N	81	73.6%**
T	58	52.7%
F	52	47.3%
J	48	43.6%**
P	62	56.4%**

For both tables above: *Difference significant at $p<0.05$, based on chi-square results.
**Difference significant at $p<0.01$, based on chi-square results.

Looking at reported type, the most frequent type preference is ENFP (18% of the total), followed by ENTJ (15%). Overall, the group tends to have a preference for Intuition, and to a lesser extent for Extraversion, Perceiving, and Thinking.

In terms of best-fit type, ENFP (21%) is also the most frequently occurring type preference, followed by ENTP (15%). The general pattern is very similar to that found with reported type, with the group tending to have a preference for Intuition, and to a lesser extent for Perceiving, Feeling and Extraversion.

Internal consistency reliability

The reliability of a test or questionnaire relates to how consistent and precise it is. Internal consistency reliability addresses the question of whether all the questions in a scale measure the same construct. A common measure of internal consistency reliability is coefficient alpha (Cronbach, 1951). The alpha coefficients for the German samples are shown in Table 7.6.

Table 7.6: Internal consistency reliability

Dimension	Coefficient alpha	
	General population	OPPassessment
E–I	0.87	0.83
S–N	0.75	0.72
T–F	0.80	0.77
J–P	0.80	0.79

It is generally agreed that internal consistency reliability should achieve a value of at least 0.7 for a test to be considered to be reliable.[4] On this basis, all of the dimensions of the questionnaire show good reliability in both groups. In addition, the alpha coefficients have been found to be consistent across different age groups and across males and females.

[4] For example, see Nunnally (1978) or Kline (2000).

Intercorrelations between MBTI dimensions

One of the original aims of developing the MBTI questionnaire was to see if dimensions could be produced that were independent of each other. Results from other language versions have shown that this was achieved with all dimensions except Sensing–Intuition and Judging–Perceiving. This shows up despite the fact that questions were carefully chosen to sort on only one dimension. The author of the questionnaire hypothesised that the S–N/J–P relationship may simply be a reflection of reality rather than a failing in the construction of the questionnaire.

The intercorrelations between dimensions amongst the OPPassessment sample are shown in Table 7.7. In order to be able to calculate the correlations, scores on each dimension were converted to continuous scores.[5]

Table 7.7: Intercorrelations between dimensions

	E–I	S–N	T–F	J–P
E–I		–0.16**	–0.13**	–0.01
S–N			0.14**	0.32**
T–F				0.18**
J–P				

**Significant at p<0.01.

Although statistically significant, only very low correlations were found between most of the dimensions. The S–N/J–P relationship that has been found with other language versions has been replicated, showing that a preference for Sensing is likely to be associated with a preference for Judging, and that a preference for Intuition is likely to be associated with a preference for Perceiving.

[5] Continuous scores (Myers and McCaulley, 1985, p. 9) place an individual's score on each dimension onto a continuous scale with a mid-point of 100. To calculate continuous scores, Preference Clarity Index (PCI) scores for each dimension are either subtracted or added to 100, depending on which direction the overall preference is. PCI scores in the direction of E, S, T or J are subtracted from 100. PCI scores in the direction of I, N, F or P are added to 100.

Validity: the accuracy of the German MBTI Step I instrument in predicting best-fit type

The purpose of the MBTI instrument is to help individuals to establish their validated or 'best fit' psychological type. A key measure of the validity of the instrument is, therefore, how well the results relate to best-fit (validated) type. These data are useful to practitioners in knowing how typically accurate the reported result is likely to be.

Best-fit data are available for two of the samples. The MBTI qualifying course delegates established their best-fit type as part of their training course, and these data were collected for the whole sample (323 people). A further 110 MBTI practitioners took part in a research study to look at the relationship between MBTI reported type and best-fit type.

Table 7.8 presents the results of the analysis comparing best-fit with reported type. The result shows that the German questionnaire performs in a similar way to other European versions, and there is very good evidence for the accuracy of the instrument. In approximately 60% of cases, a respondent's reported type will match their best-fit type, and in around 90% of cases at least three of the four preferences will match.

Table 7.8: Match of reported and best-fit type

	German qualifying training delegates (n=323)		German MBTI practitioners (n=110)	
Agrees with all four letters	59.8%	88.6%	62.7%	93.6%
Agrees with three letters	28.8%		30.9%	
Agrees with two letters	9.9%	11.4%	5.5%	6.4%
Agrees with one letter	1.2%		0.9%	
Agrees with no letters	0.3%		0.0%	

	Percentage agreement	
Dimension	German qualifying training delegates	German MBTI practitioners
E–I	90.1%	93.6%
S–N	84.5%	87.3%
T–F	84.8%	87.3%
J–P	87.0%	87.3%

Further analysis was carried out to investigate the validity and accuracy of the questionnaire. Both groups were asked how confident they felt about their results on each type dichotomy (on a scale from 1 to 5, where 5 indicated the highest degree of confidence). For every dimension, over two-thirds of the group were confident about their type, with a considerably higher proportion expressing confidence with their E–I preference (82% and 81% for the training delegates and

MBTI practitioners, respectively). This corresponds with the findings of the best-fit research, where a higher level of agreement was found between reported and best-fit preferences for the E–I dimension than for the other three dimensions. All these figures provide further support for the validity of the MBTI approach.

Detailed results are shown in Table 7.9.

Table 7.9: Degree of confidence in results

Degree of confidence	Percentage of group							
	E–I		S–N		T–F		J–P	
	Dele-gates	Practi-tioners	Dele-gates	Practi-tioners	Dele-gates	Practi-tioners	Dele-gates	Practi-tioners
5 (highest)	57%	52%	45%	42%	44%	46%	50%	49%
4	25%	29%	28%	36%	26%	25%	22%	26%
3	6%	13%	16%	14%	15%	18%	13%	15%
2	7%	4%	7%	4%	9%	7%	9%	5%
1 (lowest)	6%	3%	4%	5%	7%	4%	6%	4%
% at 4 or above	*82%*	*81%*	*73%*	*78%*	*70%*	*71%*	*72%*	*75%*

In summary, there is good evidence for the validity of the German MBTI Step I instrument. Specifically:

- There is a high level of agreement between best-fit and reported type, comparable with other European language versions.
- Respondents are confident about their results.

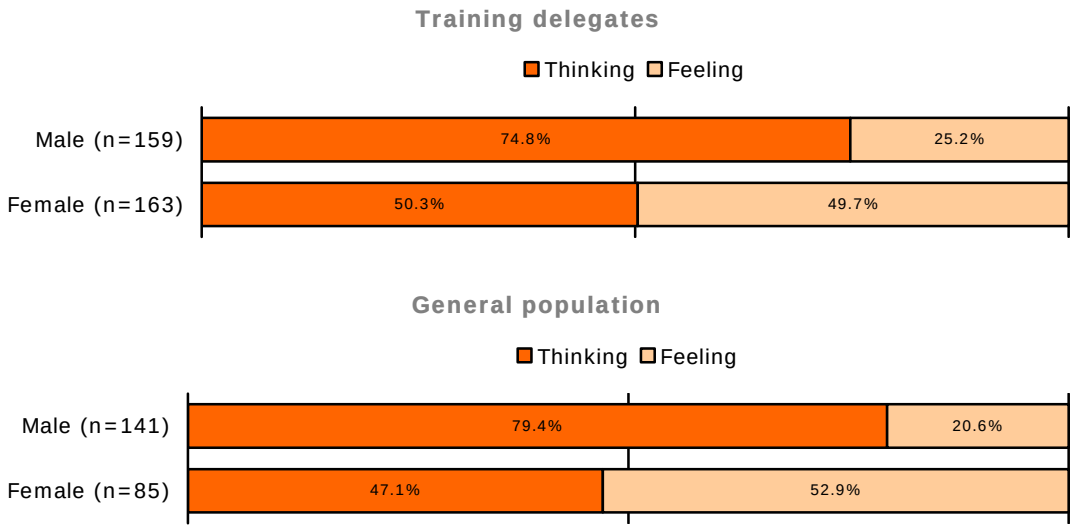
Group differences in type

Across four of the five samples, various types of demographic information was collected. The relationship of type to each of these factors is described below.

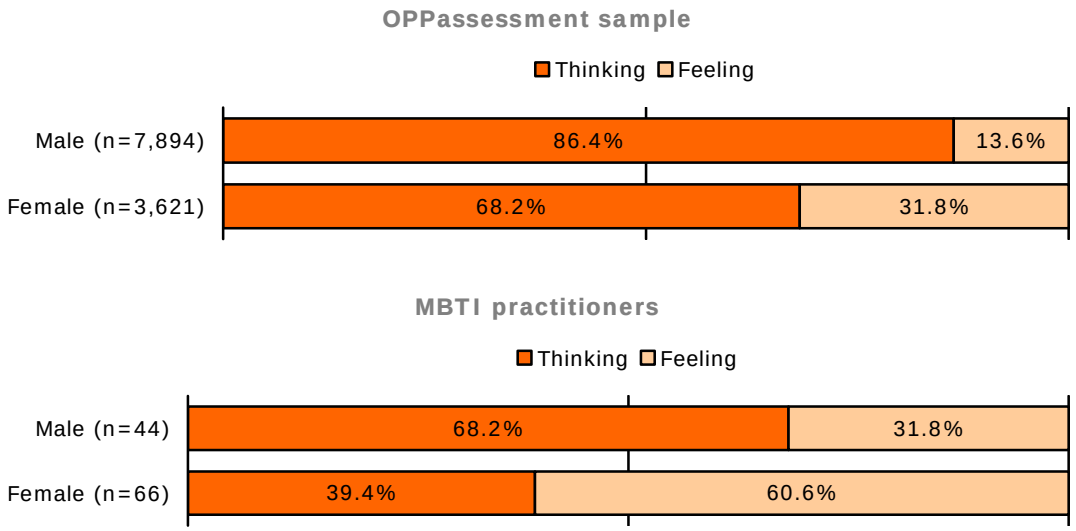
Gender

Most groups who take the MBTI questionnaire show a significant gender difference on the Thinking–Feeling dimension, and this is the case for the four groups in this study, as shown in Figure 7.1.[6]

Figure 7.1: Gender differences on the T–F dimension



[6] Training delegates: χ^2=8.84; significant at p<0.01. General population: χ^2=25.24; significant at p<0.001. OPPassessment sample: χ^2=529.23; significant at p< 0.001. MBTI practitioners: χ^2=8.75; significant at p<0.01.



When compared with the T–F distribution in the combined sample, Thinking preferences are over-represented amongst men and Feeling preferences are over-represented amongst women across the groups. This effect has been found many times with many different language versions of the instrument in a number of different cultures.

Age

Previous research using UK Step I continuous scores has shown significant correlations between age and three of the four dimensions (Warr, Miles and Platts, 2001). Older people were more likely than younger people to have preferences for Introversion, Sensing and Judging.

The data in this supplement were analysed in a slightly different way, by looking for differences in average age between people with preferences for Extraversion versus those with preferences for Introversion, for Sensing versus Intuition, for Thinking versus Feeling and for Judging versus Perceiving. The OPPassessment sample showed a statistically significant relationship between age and all four of the dimensions,[7] as shown in Table 7.10. The mean age of people with preferences for Introversion, Sensing, Thinking and Judging was higher than that of those with preferences for Extraversion, Intuition, Feeling and Perceiving. However, in real terms, the age differences were all less than about one and a half years.

Table 7.10: Significant mean age differences

	Extraversion	Introversion	Difference	Significance
Mean age (years)	36.67	38.02	1.35	***

[7] Based on independent-samples t-test.

	Sensing	Intuition	Difference	Significance
Mean age (years)	37.50	36.51	0.99	***

	Thinking	Feeling	Difference	Significance
Mean age (years)	37.16	36.60	0.56	**

	Judging	Perceiving	Difference	Significance
Mean age (years)	37.23	36.56	0.67	***

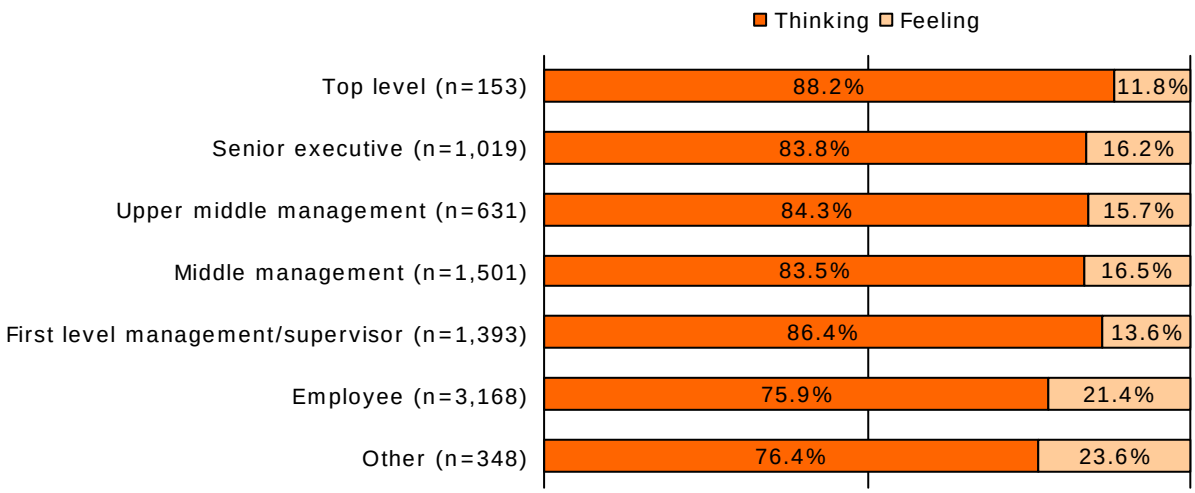
Difference significant at: *p<0.05, **p<0.01, ***p<0.001.

Occupational level

Previous research in other countries has demonstrated that individuals in higher level jobs in organisations are more likely to have preferences for Intuition and for Thinking than those in lower level jobs (Quenk, Hammer and Majors, 2004). This is not fully reflected in the relationship of the Sensing–Intuition and Thinking–Feeling dimensions with occupational level in the German OPPassessment sample.

No significant differences were found between Sensing–Intuition and occupational level. However, individuals in higher level jobs in organisations were more likely to have a preference for Thinking than those in lower level jobs, as shown in Figure 7.2.

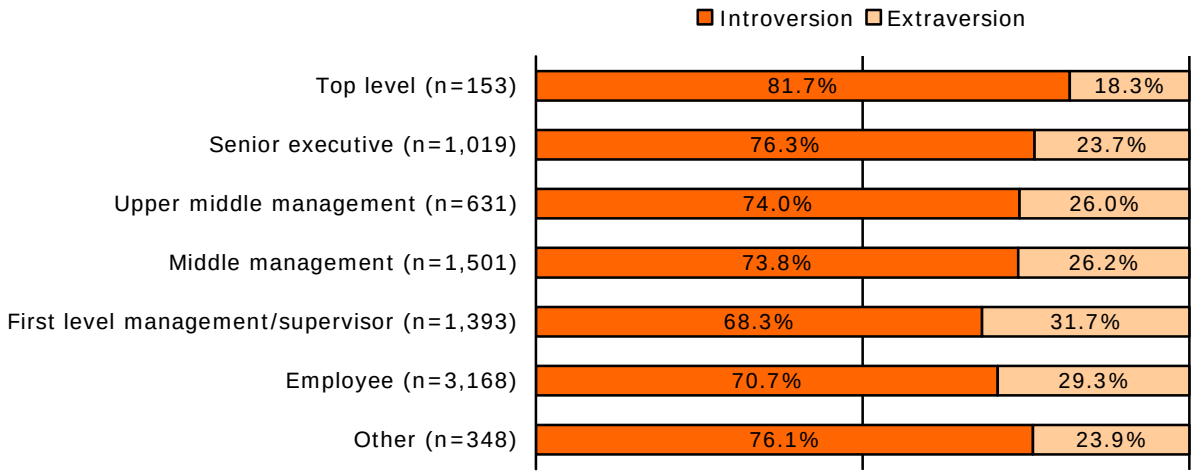
Figure 7.2: Thinking–Feeling[8] and occupational level (OPPassessment data)



[8] χ^2=106.34; significant at p<0.001.

A relationship was also found between Extraversion–Introversion and occupational level, with individuals in higher level jobs in organisations more likely to have a preference for Extraversion than those in lower level jobs, as shown in Figure 7.3.

Figure 7.3: Extraversion–Introversion[9] and occupational level (OPPassessment data)



Education

The training delegate data showed a small but statistically significant tendency[10] for those educated to degree level (or above) to be more likely to have a preference for Intuition than those who did not have a degree. However, this finding is taken from a sample containing relatively few people who did not have a degree (31 people), so should be treated with caution.

Specific educational qualifications were not available for the OPPassessment sample; however, the age at which individuals left full-time education was. Those who left full-time education at an older age were significantly more likely to have preferences for Intuition,[11] Thinking[12] and Perceiving[13].

Work area

Previous research into MBTI type suggests that an individual's type influences their choice of career (Hammer, 1998), and indeed there is a statistically significant relationship between each dimension and work

[9] $\chi^2=35.05$; significant at $p<0.001$.
[10] $\chi^2=9.35$; significant at $p<0.01$.
[11] Independent-samples t-test; $t=-7.75$, significant at $p<0.001$.
[12] Independent-samples t-test; $t=3.40$, significant at $p<0.001$.
[13] Independent-samples t-test; $t=-3.97$, significant at $p<0.001$.

area. In the figures that follow, categories have been re-ordered according to the percentage of E, S, T or J, and work areas with fewer than 100 respondents have been omitted (as well as undefined work areas such as 'Other').

Figure 7.4: Extraversion–Introversion[14] and work area

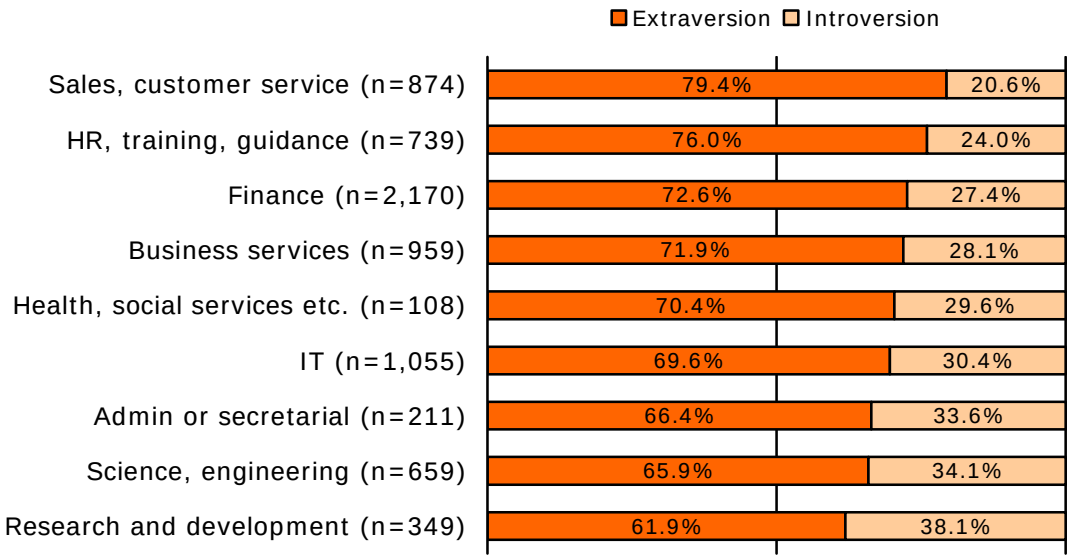
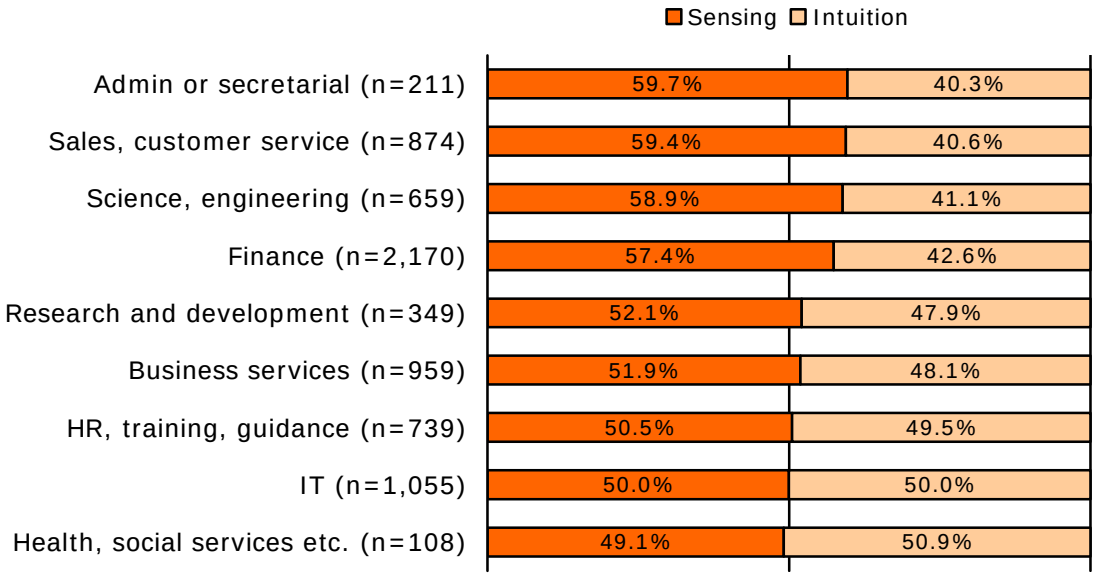


Figure 7.5: Sensing–Intuition[15] and work area



[14] χ^2=78.15; significant at p<0.001.
[15] χ^2=74.67; significant at p<0.001.

Figure 7.6: Thinking–Feeling[16] and work area

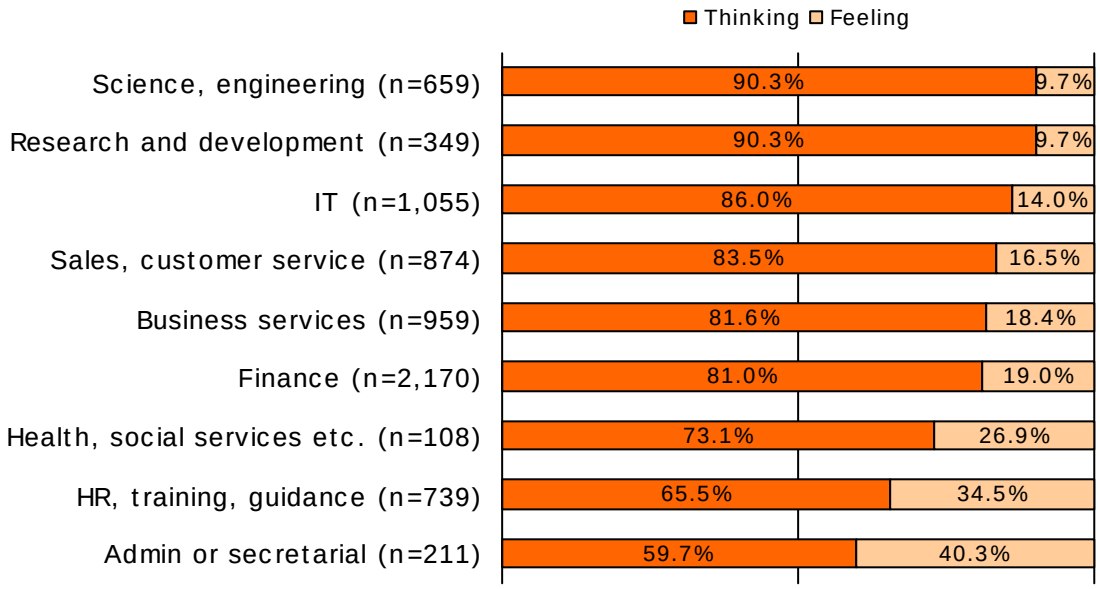
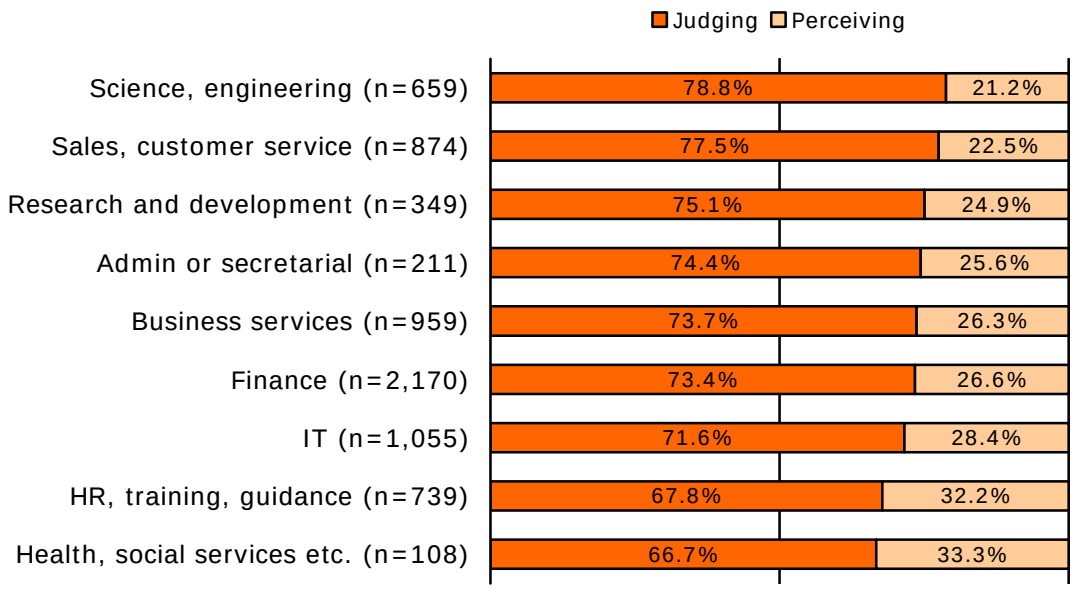


Figure 7.7: Judging–Perceiving[17] and work area



[16] χ^2=286.01; significant at p<0.001.
[17] χ^2=52.21; significant at p<0.001.

Nationality

Information on nationality was available for the OPPassessment group. Although two-thirds of the group were German, other nationalities (eg Swiss and Austrian) were also represented (see Appendix 1 for details). Type tables for the three main nationalities are shown below. Analysis suggested that the German sub-group was significantly more likely to have a Thinking[18] and a Judging[19] preference than the Swiss sub-group, and that the Austrian sub-group was significantly more likely to have a Judging[20] preference than the Swiss sub-group. The Austrian sub-group was also more likely to have an Extraversion preference than both the Germans[21] and the Swiss[22] sub-groups.

Table 7.11: Type table for German respondents (reported type, n=6,116)

ISTJ	ISFJ	INFJ	INTJ
n=772 12.6% SSR=0.92	n=83 1.4% SSR=0.11**	n=67 1.1% SSR=0.64*	n=360 5.9% SSR=4.18**
ISTP	**ISFP**	**INFP**	**INTP**
n=163 2.7% SSR=0.41**	n=31 0.5% SSR=0.08**	n=57 0.9% SSR=0.29**	n=165 2.7% SSR=1.10
ESTP	ESFP	ENFP	ENTP
n=334 5.5% SSR=0.94	n=79 1.3% SSR=0.15**	n=193 3.2% SSR=0.50**	n=502 8.2% SSR=2.98**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=1,577 25.8% SSR=2.48**	n=278 4.5% SSR=0.36**	n=277 4.5% SSR=1.64**	n=1,178 19.3% SSR=6.56**

Type	n	%
E	4,418	72.2%**
I	1,698	27.8%**
S	3,317	54.2%**
N	2,799	45.8%**
T	5,051	82.6%**
F	1,065	17.4%**
J	4,592	75.1%**
P	1,524	24.9%**

*Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

[18] χ^2=43.05; significant at p<0.001.
[19] χ^2=38.31; significant at p<0.001.
[20] χ^2=11.17; significant at p<0.001.
[21] χ^2=5.44; significant at p<0.05.
[22] χ^2=8.84; significant at p<0.01.

Table 7.12: Type table for Swiss German-speaking respondents (reported type, n=2,306)

ISTJ	ISFJ	INFJ	INTJ
n=288 12.5% SSR=0.91	n=50 2.2% SSR=0.17**	n=30 1.3% SSR=0.76	n=116 5.0% SSR=3.57**
ISTP	**ISFP**	**INFP**	**INTP**
n=74 3.2% SSR=0.50**	n=19 0.8% SSR=0.13**	n=29 1.3% SSR=0.40**	n=82 3.6% SSR=1.45*
ESTP	**ESFP**	**ENFP**	**ENTP**
n=123 5.3% SSR=0.92	n=63 2.7% SSR=0.31**	n=109 4.7% SSR=0.75*	n=230 10.0% SSR=3.62**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=489 21.2% SSR=2.04**	n=134 5.8% SSR=0.46**	n=113 4.9% SSR=1.78**	n=357 15.5% SSR=5.27**

Type	n	%
E	1,618	70.2%**
I	688	29.8%**
S	1,240	53.8%**
N	1,066	46.2%**
T	1,759	76.3%**
F	547	23.7%**
J	1,577	68.4%**
P	729	31.6%**

*Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

Table 7.13: Type table for Austrian German-speaking respondents (reported type, n=317)

ISTJ	ISFJ	INFJ	INTJ
n=37 11.7% SSR=0.85	n=4 1.3% SSR=0.10**	n=4 1.3% SSR=0.74	n=10 3.2% SSR=2.24*
ISTP	**ISFP**	**INFP**	**INTP**
n=8 2.5% SSR=0.39**	n=1 0.3% SSR=0.05**	n=1 0.3% SSR=0.10**	n=4 1.3% SSR=0.52
ESTP	**ESFP**	**ENFP**	**ENTP**
n=11 3.5% SSR=0.60	n=4 1.3% SSR=0.15**	n=12 3.8% SSR=0.60	n=30 9.5% SSR=3.44**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=93 29.3% SSR=2.82**	n=18 5.7% SSR=0.45**	n=17 5.4% SSR=1.95*	n=63 19.9% SSR=6.77**

Type	n	%
E	248	78.2%**
I	69	21.8%**
S	176	55.5%**
N	141	44.5%**
T	256	80.8%**
F	61	19.2%**
J	246	77.6%
P	71	22.4%

*Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

Table 7.14: Summary of differences by nationality

	E	I	S	N	T	F	J	P
German (n=6,116)	72%	28%	54%	46%	83%	17%	75%	25%
Swiss (n=2,306)	70%	30%	54%	46%	76%	24%	68%	32%
Austrian (n=317)	78%	22%	55%	45%	81%	19%	78%	22%

Employment status

Employment status (available for the OPPassessment sample) showed a relationship with the Sensing–Intuition and Thinking–Feeling dimensions. Those who were self-employed were more likely than other groups to have a preference for Intuition,[23] whereas those who worked part-time were more likely than other groups to have a preference for Feeling.[24] This is likely to be a gender effect; 77% of part-time workers were female, compared with 30% of the total group and 28% of full-time workers.

[23] χ^2=25.02; significant at p<0.001.
[24] χ^2=100.25; significant at p<0.001.

Appendix 1: Sample descriptions

Sample 1: Data from OPPassessment (representative German-speaking professional and managerial sample)

This sample consists of 11,515 individuals who completed the MBTI Step I questionnaire in German via the OPPassessment system between January 2004 and June 2008. Sixty-nine per cent of the respondents were male and 31% were female. Age ranged from 16 to 65 years, with a mean of 36 and a median of 35.

Nationality was disclosed by 80% of respondents, two-thirds of whom were German:

Nationality	Percentage
German	66.3%
Swiss	25.0%
Austrian	3.4%
Other European	4.6%
Other	0.7%

The majority of the group were in full-time employment:

Employment status	Percentage
Full-time	92.8%
Part-time	5.1%
Self-employed	1.6%
Unemployed	0.3%
Homemaker	0.2%
Retired	0.1%

The majority of the group were of managerial level or above, although the largest single group was employee level (38.6%):

Occupational level	Percentage
Top level	1.9%
Senior executive	12.4%
Upper middle management	7.7%
Middle management	18.3%
First level management/supervisor	17.0%
Employee	38.6%
Other	4.2%

A range of work areas were represented:

Work area (job type)	Percentage
Finance	26.3%
IT	12.8%
Business services	11.6%
Sales, customer service	10.6%
HR, training, guidance	9.0%
Science, engineering	8.0%
Research and development	4.2%
Admin or secretarial	2.6%
Health, social services, etc.	1.3%
Education	1.0%
Land, sea or air transport	0.8%
Skilled operative	0.4%
Leisure, personal service	0.1%
Other private sector	0.9%
Other public sector	0.3%
Other	9.9%

Sample 2: General population

This sample consisted of 228 individuals who completed a trial version of the MBTI questionnaire as part of the development of the Step II instrument in 2003. This sample was designed to be representative of the German general population, and every individual was of German nationality.

Of the group, 141 (62%) were male and 85 (38%) female; age ranged from 17 to 53 years (with an average age of 31).

In terms of occupational level, 88 people (39%) described themselves as being at employee level, with 30 (13%) at first level management or supervisory level, 29 (13%) at middle management level, and 18 (8%) at top or senior executive level.

Sample 3: Management development programme participants

The sample consisted of 687 German participants on management development programmes at Ashridge Business School, run between 2000 and 2003. Eighty-seven per cent of the group were male and 13% female. Age ranged from 24 to 63 years.

Sample 4: MBTI Qualifying training course delegates

This sample consisted of 323 delegates on German MBTI qualifying training courses from early 2002 to February 2006. Of this group, 163 (50.6%) were female and 159 (49.4%) male; age ranged from 19 to 74 years (with an average age of 38).

In total, 242 people (75%) were educated to degree level or above. Of these, 37 (11%) held a Doctorate and 187 (58%) held a Masters degree. The remaining 18 (6%) held a first degree.

With regard to employment status, 209 people (66%) described themselves as being employed full-time, whilst a further 72 people (23%) described themselves as self-employed. Twenty-one people (7%) worked part-time, and a further 12 (4%) were not in employment.

In terms of job level, 117 people (36%) were at employee level, with 50 (16%) at first level management or supervisory level, 48 (15%) at middle management level, and 55 (17%) at top or senior executive level. Thirty-seven people (12%) described their job level as 'other'. Job type data were not recorded for all the delegates, but the most common job types amongst those for whom data were available was 'HR, training, guidance' (95 people, or 29%).

Sample 5: MBTI practitioners

This sample consisted of 110 MBTI practitioners who took part in a research study to look at the relationship between MBTI reported type and best-fit type.

Of this group, 66 (60%) were female and 44 (40%) were male. Age ranged from 26 to 62 years, with a mean of 43. Seventy-three respondents (66%) were German, 20 (18%) were Swiss and five (5%) were Austrian.

Forty-eight people (44%) described their employment status as self-employed, whilst 44 people (40%) described themselves as working full-time and nine (8%) as working part-time.

In terms of job level, 27 people (25%) were at employee level, with four (4%) at first level management or supervisory level, 15 (14%) at middle management level, and 25 (23%) at top or senior executive level. The most common job types amongst the group were 'HR, training, guidance' (71 people, or 65%), and 'Training' (ten people, or 9%).

MBTI® Step I instrument

European Data Supplement

Italian

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Contents

Introduction

Data collected from the Italian version of the MBTI Step I questionnaire were analysed to produce the findings in this chapter. Brief descriptions of the two samples are given below, with further details provided in Appendix 1.

- A group of 1,987 individuals who completed the MBTI Step I questionnaire in Italian via the OPPassessment system between 2004 and mid-2008.[1] This sample is considered to be representative of the groups of people with whom the Italian MBTI instrument has been and will be used for applications such as management development, coaching, counselling and teambuilding. As such, it is likely to represent a cross-section of the Italian-speaking professional and managerial population.

- A sample of 128 Italian participants on management development programmes at Ashridge Business School, run between 2000 and 2003.[2]

The results of the analyses are outlined below.

[1] OPPassessment allows personality questionnaires such as the MBTI instrument to be administered via email and/or completed online.
[2] Data reproduced with kind permission from Ashridge Business School.

Type distribution

Type tables are a way of illustrating the proportion of each type within a particular group. Opposite is a type table for the Italian sample described on the previous page.

For each of the 16 different types, the number of cases, the percentage of the total that this represents and the self-selection ratio (SSR) are shown. The SSR (Myers et al., 1998) is a way of demonstrating whether a given type appears more or less often in a particular group than would be expected given its frequency in a reference group. An SSR of greater than 1 indicates that a type is over-represented, and an SSR of less than 1 denotes that it is under-represented. Asterisks are used to denote whether the over- or under-representations are statistically significant, based on the results of chi-square analysis.[3]

Ideally, the type distribution from a large representative sample of the Italian population would be used to calculate SSRs in this data supplement. However, such a sample does not currently exist. In its place, SSRs have been calculated using type data from the UK general population (Kendall, 1998), which can be justified by the fact that type distributions for comparable Italian and British groups, such as managers and professionals, are similar. Evidence (eg Hackston and Kendall, 2004; Quenk et al., 2004; Kirby, Kendall and Barger, 2007) does suggest that although type-related behaviours vary a good deal from country to country and from culture to culture, the frequencies of underlying MBTI types do not.

[3] Chi-square analysis (often abbreviated to χ^2) is a technique used to explore whether observed frequency distributions differ significantly from other, predefined, distributions. In this case, the UK general population group is used as the reference group, and the chi-square analysis indicates whether the proportion of people of each type within a particular sample differs significantly from the proportion of people reporting the same type within the reference group.

OPPassessment data (representative Italian-speaking professional and managerial sample)

Table 8.1: Type Table for OPPassessment data (reported type, n=1,987)

ISTJ	ISFJ	INFJ	INTJ
n=297 14.9% SSR=1.09	n=59 3.0% SSR=0.23**	n=35 1.8% SSR=1.03	n=112 5.6% SSR=4.00**
ISTP	**ISFP**	**INFP**	**INTP**
n=51 2.6% SSR=0.40**	n=21 1.1% SSR=0.17**	n=27 1.4% SSR=0.43**	n=80 4.0% SSR=1.64**
ESTP	**ESFP**	**ENFP**	**ENTP**
n=78 3.9% SSR=0.68**	n=29 1.5% SSR=0.17**	n=79 4.0% SSR=0.63**	n=125 6.3% SSR=2.28**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=468 23.6% SSR=2.26**	n=119 6.0% SSR=0.48**	n=100 5.0% SSR=1.83**	n=307 15.5% SSR=5.26**

Type	n	%
E	1,305	65.7%**
I	682	34.3%**
S	1,122	56.5%**
N	865	43.5%**
T	1,518	76.4%**
F	469	23.6%**
J	1,497	75.3%**
P	490	24.7%**

*Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

The most common single type preference is ESTJ (24% of the total), followed by ENTJ (16%); this is a common finding with managerial groups in other countries. The SSR results suggest that, in comparison with the UK general population, those with preferences for NT are over-represented, and those with preferences for SF are under-represented. Again, this is a common finding with managerial groups.

Management development programme participants

Table 8.2: Type table for management development programme participants (reported type, n=128)

ISTJ	ISFJ	INFJ	INTJ
n=15 11.7% SSR=0.85	n=2 1.6% SSR=0.12**	n=2 1.6% SSR=0.91	n=9 7.0% SSR=5.00**
ISTP	**ISFP**	**INFP**	**INTP**
n=4 3.1% SSR=0.49**	n=1 0.8% SSR=0.13**	n=2 1.6% SSR=0.49	n=5 3.9% SSR=1.60
ESTP	**ESFP**	**ENFP**	**ENTP**
n=4 3.1% SSR=0.54	n=3 2.3% SSR=0.27*	n=4 3.1% SSR=0.50	n=16 12.5% SSR=4.54**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=31 24.2% SSR=2.33**	n=5 3.9% SSR=0.31**	n=2 1.6% SSR=0.57	n=23 18.0% SSR=6.12**

Type	n	%
E	88	68.8%**
I	40	31.3%**
S	65	50.8%**
N	63	49.2%**
T	107	83.6%**
F	21	16.4%**
J	89	69.5%*
P	39	30.5%*

*Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

The type distribution is similar to that for the OPPassessment sample described earlier, with ESTJ (24% of the total) being the most common single type preference, and NT being over-represented and SF being under-represented.

Internal consistency reliability

The reliability of a test or questionnaire relates to how consistent and precise it is. The internal consistency reliability addresses the question of whether all the questions in a scale measure the same construct. A common measure of internal consistency reliability is coefficient alpha (Cronbach, 1951). The alpha coefficients for the Italian OPPassessment sample are shown in Table 8.3.

Table 8.3: Internal consistency reliability

Dimension	Coefficient alpha
E–I	0.81
S–N	0.75
T–F	0.74
J–P	0.78

It is generally agreed that internal consistency reliability should achieve a value of at least 0.7 for a test to be considered to be reliable.[4] On this basis, all of the dimensions of the questionnaire show good reliability. In addition, the alpha coefficients have been found to be consistent across different age groups and across males and females.

[4] For example, see Nunnally (1978) or Kline (2000).

Intercorrelations between MBTI dimensions

One of the original aims of developing the MBTI questionnaire was to see if dimensions could be produced that were independent of each other. Results from other language versions have shown that this was achieved with all dimensions except Sensing–Intuition and Judging–Perceiving. This shows up despite the fact that questions were carefully chosen to sort on only one dimension. The author of the questionnaire hypothesised that the S–N/J–P relationship may simply be a reflection of reality rather than a failing in the construction of the questionnaire.

The intercorrelations between dimensions amongst the Italian OPPassessment sample are shown in Table 8.4. In order to be able to calculate the correlations, scores on each dimension were converted to continuous scores.[5]

Table 8.4: Intercorrelations between dimensions

	E–I	S–N	T–F	J–P
E–I		–0.12**	–0.14**	0.02
S–N			0.18**	0.37**
T–F				0.19**
J–P				

**Significant at p<0.01.

Although statistically significant, only very low correlations were found between most of the dimensions. The S–N/J–P relationship that has been found with other language versions has been replicated, showing that a preference for Sensing is likely to be associated with a preference for Judging, and that a preference for Intuition is likely to be associated with a preference for Perceiving.

[5] Continuous scores (Myers and McCaulley, 1985, p. 9) place an individual's score on each dimension onto a continuous scale with a mid-point of 100. To calculate continuous scores, Preference Clarity Index (PCI) scores for each dimension are either subtracted or added to 100, depending on which direction the overall preference is. PCI scores in the direction of E, S, T or J are subtracted from 100. PCI scores in the direction of I, N, F or P are added to 100.

Validity: the accuracy of the Italian MBTI Step I instrument in predicting best-fit type

At present, insufficient data have been collected for the Italian language version to be able to report any best-fit validity results.

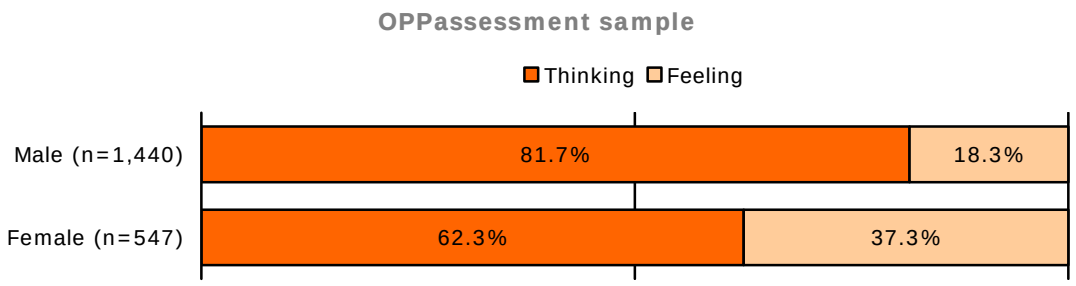
Group differences in type

Various types of demographic information were collected for the Italian OPPassessment sample. The relationship of type to each of these factors is described below.

Gender

Most groups who take the MBTI questionnaire show a significant gender difference on the Thinking–Feeling dimension, and this is the case for the group in this study, as shown in Figure 8.1.[6]

Figure 8.1: Gender differences on the T–F dimension



When compared with the T–F distribution in the combined sample, Thinking preferences are over-represented amongst men and Feeling preferences are over-represented amongst women (although even amongst women in this group there are more individuals with a preference for Thinking than for Feeling). This effect has been found many times with many different versions of the instrument in a number of different cultures.

Age

Previous research using UK Step I continuous scores has shown significant correlations between age and three of the four dimensions (Warr, Miles and Platts, 2001). Older people were more likely than younger people to have preferences for Introversion, Sensing and Judging.

[6] $\chi^2=82.71$; significant at $p<0.001$.

The data in this supplement were analysed in a slightly different way, by looking for differences in average age between people with preferences for Extraversion versus those with preferences for Introversion, for Sensing versus Intuition, for Thinking versus Feeling and for Judging versus Perceiving. The OPPassessment sample showed a statistically significant relationship between age and two of the dimensions,[7] as shown in Table 8.5. The mean age of people with a preference for Introversion and/or Thinking was approximately one year higher than that of those with a preference for Extraversion and/or Feeling.

Table 8.5: Significant mean age differences

	Extraversion	Introversion	Difference	Significance
Mean age (years)	37.01	37.87	0.86	*

	Thinking	Feeling	Difference	Significance
Mean age (years)	37.57	36.42	1.15	*

Difference significant at: *p<0.05, **p<0.01, ***p<0.001.

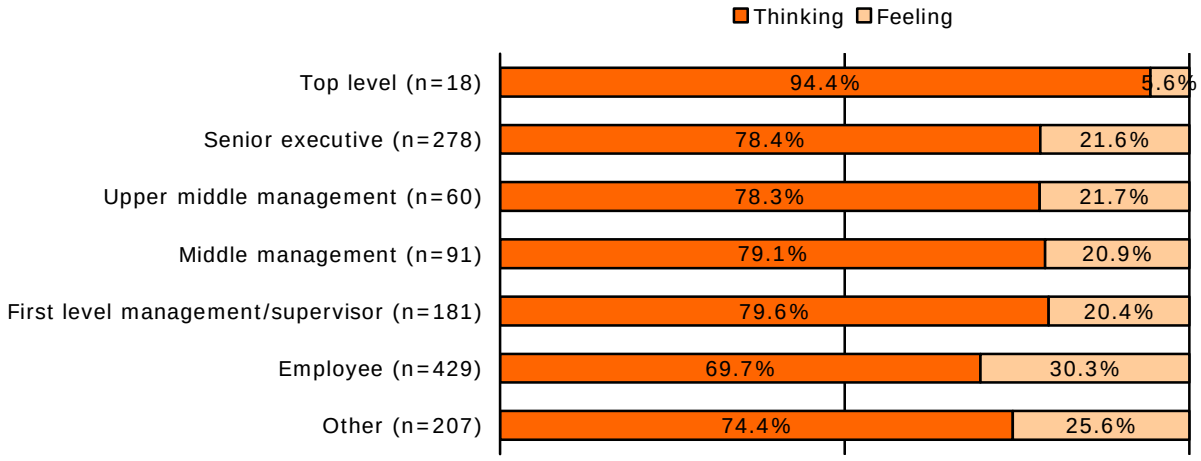
Occupational level

Previous research in other countries has demonstrated that individuals in higher level jobs in organisations are more likely to have preferences for Intuition and for Thinking than those in lower level jobs (Quenk, Hammer and Majors, 2004). This is in part reflected in the relationship of the Thinking–Feeling dimension with occupational level in the OPPassessment sample.

The data suggest that individuals at employee level are more likely to have a preference for Feeling than those at higher levels, with the proportion of people with preferences for Feeling remaining fairly consistent from first level management/supervisor through to senior executive level, as shown in Figure 8.2.

[7] Independent-samples t-test; both significant at p<0.05.

Figure 8.2: Thinking–Feeling[8] and occupational level (OPPassessment data)



Education

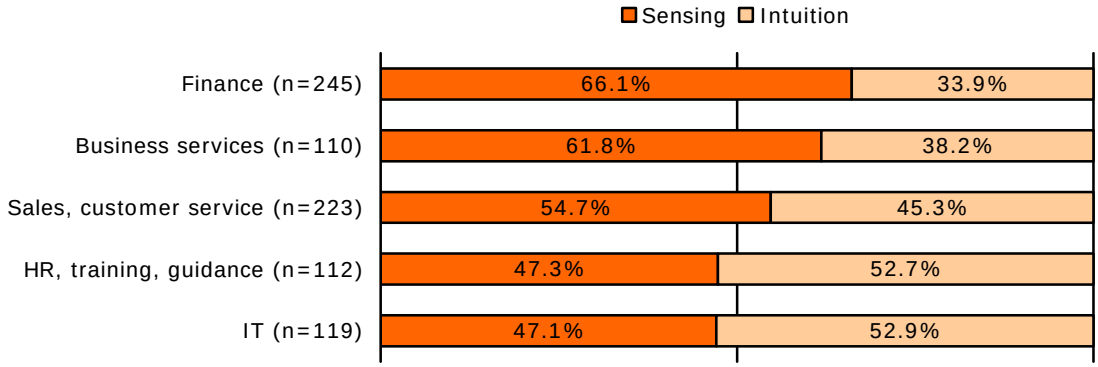
Specific educational qualifications were not available for the OPPassessment sample; however, the age at which individuals left full-time education was. There was found to be a link between two of the dimensions and the age at which individuals left full-time education. On average, people with preferences for Intuition and/or Thinking left education approximately one year later than those with a preference for Sensing and/or Feeling.

Work area

Previous research into MBTI type suggests that an individual's type influences their choice of career (Hammer, 1998). For this sample, there is a statistically significant relationship between only the Sensing–Intuition dimension and work area. In Figure 8.3, categories have been re-ordered according to the percentage of Sensing types, and work areas with fewer than 100 respondents have been omitted (as well as undefined work areas such as 'Other').

[8] $\chi^2 = 15.08$; significant at $p<0.05$.

Figure 8.3: Sensing–Intuition[9] and work area



Nationality

Information on nationality was available for the OPPassessment group: 89% of the group were Italian and 9% were Swiss.

Type tables for the two main nationalities are shown below, along with a summary of the differences. Analysis suggested that the Italian sub-group was significantly more likely to have a preference for Intuition[10] and for Thinking[11] than the Swiss sub-group.

Table 8.6: Type table for Italian respondents (reported type, n=1,426)

ISTJ	ISFJ	INFJ	INTJ
n=185 13.0% SSR=0.95	n=40 2.8% SSR=0.22**	n=25 1.8% SSR=1.02	n=88 6.2% SSR=4.38**
ISTP	**ISFP**	**INFP**	**INTP**
n=32 2.2% SSR=0.35**	n=15 1.1% SSR=0.17**	n=22 1.5% SSR=0.48**	n=55 3.9% SSR=1.58*
ESTP	**ESFP**	**ENFP**	**ENTP**
n=50 3.5% SSR=0.60**	n=20 1.4% SSR=0.16**	n=61 4.3% SSR=0.68*	n=99 6.9% SSR=2.52**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=343 24.1% SSR=2.31**	n=81 5.7% SSR=0.45**	n=71 5.0% SSR=1.81**	n=239 16.8% SSR=5.71**

Type	n	%
E	964	67.6%**
I	462	32.4%**
S	766	53.7%**
N	660	46.3%**
T	1,091	76.5%**
F	335	23.5%**
J	1,072	75.2%**
P	354	24.8%**

*Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

[9] χ^2=36.98; significant at p<0.01.
[10] χ^2=17.02; significant at p<0.001.
[11] χ^2=3.83; significant at p<0.05.

Table 8.7: Type table for Swiss Italian-speaking respondents (reported type, n=139)

ISTJ	ISFJ	INFJ	INTJ
n=32 23.0% SSR=1.68**	n=6 4.3% SSR=0.34**	n=2 1.4% SSR=0.84	n=5 3.6% SSR=2.56*
ISTP	**ISFP**	**INFP**	**INTP**
n=3 2.2% SSR=0.34*	n=4 2.9% SSR=0.47	n=0 0.0% SSR=0.00*	n=2 1.4% SSR=0.59
ESTP	**ESFP**	**ENFP**	**ENTP**
n=6 4.3% SSR=0.74	n=8 5.8% SSR=0.66	n=3 2.2% SSR=0.34*	n=4 2.9% SSR=1.04
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=29 20.9% SSR=2.01**	n=12 8.6% SSR=0.68	n=8 5.8% SSR=2.09*	n=15 10.8% SSR=3.67**

Type	n	%
E	85	61.2%*
I	54	38.8%*
S	100	71.9%
N	39	28.1%
T	96	69.1%**
F	43	30.9%**
J	109	78.4%**
P	30	21.6%**

*Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

Table 8.8: Summary of differences by nationality

	E	I	S	N	T	F	J	P
Italian (n=1,426)	68%	32%	54%	46%	76%	24%	75%	25%
Swiss (n=139)	61%	39%	72%	28%	69%	31%	78%	22%

Employment status

Employment status has often been found to show a relationship with MBTI dimensions in other language versions. However, amongst the Italian-speaking sample, 96% of the group reported that they worked full-time. There were insufficient numbers of people who worked part-time or were self-employed for any group-level analyses to be conducted. Once additional data become available it will be possible to conduct this analysis.

Appendix 1: Sample description

Sample 1: Data from OPPassessment (representative Italian-speaking professional and managerial sample)

This sample consists of 1,987 individuals who completed the MBTI Step I instrument in Italian via the OPPassessment system between 2004 and mid-2008. Seventy-three per cent of the respondents were male and 27% were female. Age ranged from 18 to 66 years, with a mean of 37 and a median of 36.

Nationality was disclosed by 80% of respondents. Of these, 89% were Italian and 9% were Swiss. No other individual nationality was represented in large numbers.

Nationality	Percentage
Italian	89.3%
Swiss	8.7%
Other	2.0%

The majority of the group were in full-time employment:

Employment status	Percentage
Full-time	95.6%
Part-time	1.8%
Self-employed	2.6%
Unemployed	0.1%

Many of the group were of managerial level or above, but with the largest single group being employee (34%):

Occupational level	Percentage
Top level	1.4%
Senior executive	22.0%
Upper middle management	4.7%
Middle management	7.2%
First level management/supervisor	14.3%
Employee	33.9%
Other	16.4%

A range of work areas were represented:

Work area (job type)	Percentage
Finance	19.2%
Sales, customer service	17.5%
IT	9.3%
HR, training, guidance	8.8%
Business services	8.6%
Research and development	5.6%
Science, engineering	4.5%
Admin or secretarial	3.2%
Land, sea or air transport	1.0%
Health, social services, etc.	0.3%
Leisure, personal service	0.2%
Unskilled operative	0.2%
Education	0.1%
Skilled operative	0.1%
Other private sector	7.8%
Other public sector	0.2%
Other	13.3%

Sample 2: Management development programme participants

The sample consisted of 128 Italian participants on management development programmes at Ashridge Business School, run between 2000 and 2003. Eighty-six per cent of the group were male and 14% female. Age ranged from 28 to 58 years.

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Contents

Introduction

Data collected from the Norwegian electronic version of the MBTI Step I questionnaire were analysed to produce the findings in this supplement. A brief description of the sample is given below, with further details provided in Appendix 1.

- The sample consisted of 915 individuals who completed the MBTI Step I questionnaire in Norwegian via the OPPassessment system between 2004 and mid-2008.[1.] This sample is considered to be representative of the groups of people with whom the Norwegian MBTI instrument has been and will be used for applications such as management development, coaching, counselling and teambuilding. As such, it is likely to represent a cross-section of the Norwegian-speaking professional and managerial population.

The results of the analyses are outlined below.

[1] OPPassessment allows personality questionnaires such as the MBTI instrument to be administered via email and/or completed online.

Type distribution

Type tables are a way of illustrating the proportion of each type within a particular group. Opposite is a type table for the Norwegian sample described on the previous page.

For each of the 16 different types, the number of cases, the percentage of the total that this represents and the self-selection ratio (SSR) are shown. The SSR (Myers et al., 1998) is a way of demonstrating whether a given type appears more or less often in a particular group than would be expected given its frequency in a reference group. An SSR of greater than 1 indicates that a type is over-represented, and an SSR of less than 1 denotes that it is under-represented. Asterisks are used to denote whether the over- or under-representations are statistically significant, based on the results of chi-square analysis.[2]

Ideally, the type distribution from a large representative sample of the Norwegian population would be used to calculate SSRs in this data supplement. However, such a sample does not currently exist. In its place, SSRs have been calculated using type data from the UK general population (Kendall, 1998), which can be justified by the fact that type distributions for comparable Norwegian and British groups, such as managers, are similar. Evidence (eg Hackston and Kendall, 2004; Quenk et al., 2004; Kirby, Kendall and Barger, 2007) does suggest that although type-related behaviours vary a good deal from country to country and from culture to culture, the frequencies of underlying MBTI types do not.

[2] Chi-square analysis (often abbreviated to χ^2) is a technique used to explore whether observed frequency distributions differ significantly from other, predefined, distributions. In this case, the UK general population group is used as the reference group, and the chi-square analysis indicates whether the proportion of people of each type within a particular sample differs significantly from the proportion of people reporting the same type within the reference group.

OPPassessment data (representative Norwegian-speaking professional and managerial sample)

Table 9.1: Type table for OPPassessment Data (reported type, n=915)

ISTJ	ISFJ	INFJ	INTJ
n=90 9.8% SSR=0.72**	n=14 1.5% SSR=0.12**	n=4 0.4% SSR=0.26**	n=16 1.7% SSR=1.24
ISTP	**ISFP**	**INFP**	**INTP**
n=29 3.2% SSR=0.49**	n=6 0.7% SSR=0.11**	n=4 0.4% SSR=0.14**	n=17 1.9% SSR=0.76
ESTP	**ESFP**	**ENFP**	**ENTP**
n=101 11.0% SSR=1.90**	n=15 1.6% SSR=0.19**	n=24 2.6% SSR=0.42**	n=86 9.4% SSR=3.41**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=311 34.0% SSR=3.27**	n=53 5.8% SSR=0.46**	n=15 1.6% SSR=0.60	n=130 14.2% SSR=4.84**

Type	n	%
E	735	80.3%**
I	180	19.7%**
S	619	67.7%**
N	296	32.3%**
T	780	85.2%**
F	135	14.8%**
J	633	69.2%**
P	282	30.8%**

*Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

The most common single type preference is ESTJ (34% of the total), followed by ENTJ (14%); this is a common finding with managerial groups in other countries. The SSR results suggest that, in comparison with the UK general population, those with preferences for F, and particularly SF, are under-represented. This is a common finding with managerial groups, although it is often found to occur alongside an over-representation of NT types. This was not consistently found to be the case for the Norwegian group, where only the two ENT groups were over-represented.

Internal consistency reliability

The reliability of a test or questionnaire relates to how consistent and precise it is. Internal consistency reliability addresses the question of whether all the questions in a scale measure the same construct. A common measure of internal consistency reliability is coefficient alpha (Cronbach, 1951). The alpha coefficients for the Norwegian OPPassessment sample are shown in Table 9.2.

Table 9.2: Internal consistency reliability

Dimension	Coefficient alpha
E–I	0.84
S–N	0.80
T–F	0.72
J–P	0.80

It is generally agreed that internal consistency reliability should achieve a value of at least 0.7 for a test to be considered to be reliable.[3] On this basis, all of the dimensions of the questionnaire show good reliability. In addition, the alpha coefficients have been found to be consistent across different age groups and both genders.

[3] For example, see Nunnally (1978) or Kline (2000).

Intercorrelations between MBTI dimensions

One of the original aims of developing the MBTI questionnaire was to see if dimensions could be produced that were independent of each other. Results from other language versions have shown that this was achieved with all dimensions except Sensing–Intuition and Judging–Perceiving. This shows up despite the fact that questions were carefully chosen to sort on only one dimension. The author of the questionnaire hypothesised that the S–N/J–P relationship may simply be a reflection of reality rather than a failing in the construction of the questionnaire.

The intercorrelations between dimensions amongst the OPPassessment sample are shown in Table 9.3. In order to be able to calculate the correlations, scores on each dimension were converted to continuous scores.[4]

Table 9.3: Intercorrelations between dimensions

	E–I	S–N	T–F	J–P
E–I		–0.17**	–0.04	–0.02
S–N			0.06	0.36**
T–F				0.05
J–P				

**Significant at p<0.01.

Only very low correlations were found between most of the dimensions. The S–N/J–P relationship that has been found with other language versions has been replicated, showing that a preference for Sensing is likely to be associated with a preference for Judging, and that a preference for Intuition is likely to be associated with a preference for Perceiving. The E–I/S–N correlation was statistically significant, but very small in real terms.

[4] Continuous scores (Myers and McCaulley, 1985, p. 9) place an individual's score on each dimension onto a continuous scale with a mid-point of 100. To calculate continuous scores, Preference Clarity Index (PCI) scores for each dimension are either subtracted or added to 100, depending on which direction the overall preference is. PCI scores in the direction of E, S, T or J are subtracted from 100. PCI scores in the direction of I, N, F or P are added to 100.

Validity: the accuracy of the Norwegian MBTI Step I instrument in predicting best-fit type

At present, insufficient data have been collected for the Norwegian language version to be able to report any best-fit validity results.

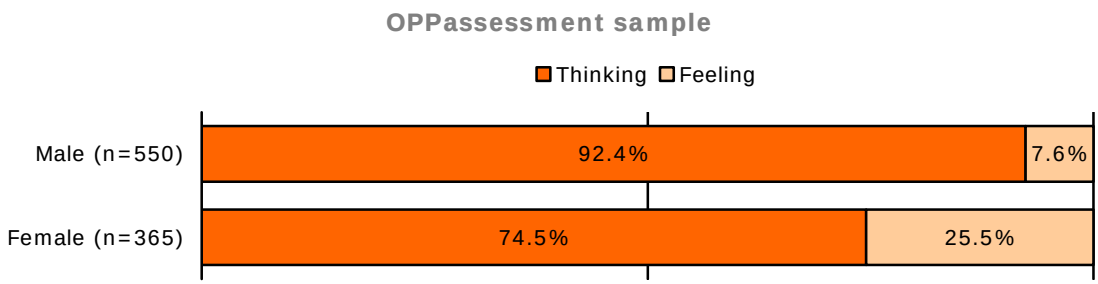
Group differences in type

Various types of demographic information were collected for the OPPassessment sample. The relationship of type to each of these factors is described below.

Gender

Most groups who take the MBTI questionnaire show a significant gender difference on the Thinking–Feeling dimension, and this is the case for the group in this study, as shown in Figure 9.1.[5]

Figure 9.1: Gender differences on the T–F dimension

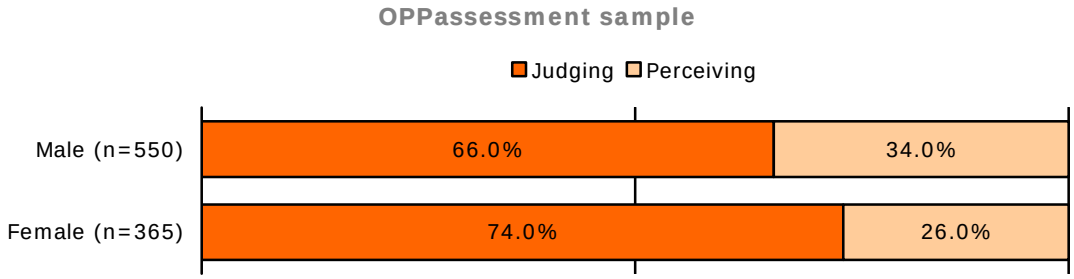


When compared with the T–F distribution in the combined sample, Thinking preferences are over-represented amongst men and Feeling preferences are over-represented amongst women (although even amongst women in this group there are more individuals with a preference for Thinking than for Feeling). This effect has been found many times with many different versions of the instrument in a number of different cultures.

For this group, there were also significant gender differences on the Judging–Perceiving dimension, as shown in Figure 9.2.[6] Judging preferences are over-represented amongst women and Perceiving preferences are over-represented amongst men.

[5] $\chi^2=55.54$; significant at $p<0.001$.
[6] $\chi^2=6.54$; significant at $p<0.05$.

Figure 9.2: Gender differences on the J–P dimension



Age

Previous research using UK Step I continuous scores has shown significant correlations between age and three of the four dimensions (Warr, Miles and Platts, 2001). Older people were more likely than younger people to have preferences for Introversion, Sensing and Judging.

The data in this supplement were analysed in a slightly different way, by looking for differences in average age between people with preferences for Extraversion versus those with preferences for Introversion, Sensing versus Intuition, Thinking versus Feeling and Judging versus Perceiving. The OPPassessment sample showed a statistically significant relationship between age and one of the dimensions,[7] as shown in Table 9.4. The mean age of people with a preference for Judging was approximately two years higher than of those with a preference for Perceiving.

Table 9.4: Significant mean age differences

	Judging	Perceiving	Difference	Significance
Mean age (years)	42.48	40.38	2.10	**

Difference significant at: *p<0.05, **p<0.01, ***p<0.001.

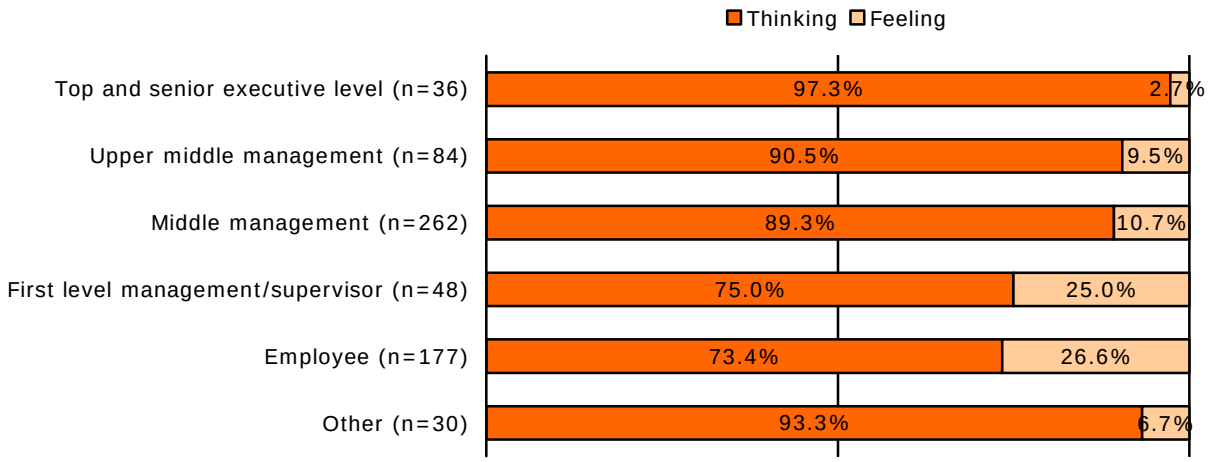
Occupational level

Previous research in other countries has demonstrated that individuals in higher level jobs in organisations are more likely to have preferences for Intuition and for Thinking than those in lower level jobs (Quenk, Hammer and Majors, 2004). This is in part reflected in the relationship of the Thinking–Feeling dimension with occupational level in the OPPassessment sample.

[7] Independent-samples t-test; significant at p<0.01.

The data suggest that individuals at the top and senior executive levels are most likely to have a preference for Thinking, and the proportion of people with Thinking preferences decreases steadily with occupational level, as shown in Figure 9.3.

Figure 9.3: Thinking–Feeling[8] and occupational level (OPPassessment data)



Education

Specific educational qualifications were not available for the OPPassessment sample; however, the age at which individuals left full-time education was. There was found to be a link between two of the dimensions and the age at which individuals left full-time education. On average, people with preferences for Intuition and/or Thinking left education approximately two years later than those with a preference for Sensing and/or Feeling.

Work area

Previous research into MBTI type suggests that an individual's type influences their choice of career (Hammer, 1998), and indeed there is often found to be a statistically significant relationship between MBTI dimensions and work area. However, at this stage, for the data we have collected there are insufficient numbers of people in each work area category for the analyses to be conducted. This work will be conducted once additional data become available.

[8] $\chi^2=33.18$; significant at $p<0.001$.

Nationality

Information on nationality was available for the OPPassessment group, 95% of whom were Norwegian No other nationality was represented in sufficiently large numbers for an analysis of type differences by nationality to be conducted.

Employment status

Employment status has often been found to show a relationship with MBTI dimensions in other language versions. However, amongst the Norwegian sample 96% of the group reported that they worked full-time. There were insufficient numbers of people who worked part-time or were self-employed for any group-level analyses to be conducted. Once additional data become available it will be possible to conduct this analysis.

Appendix 1: Sample description

Sample 1: Data from OPPassessment (representative Norwegian-speaking professional and managerial sample)

This sample consists of 915 individuals who completed the MBTI Step I instrument in Norwegian via the OPPassessment system between 2004 and mid-2008. Sixty per cent of the respondents were male and 40% were female. Age ranged from 23 to 65 years, with a mean of 42 and a median of 41.

Nationality was disclosed by 80% of respondents. Of these, 95% were Norwegian. No other individual nationality was represented in large numbers.

Nationality	Percentage
Norwegian	95.2%
Other	4.8%

The majority of the group were in full-time employment:

Employment status	Percentage
Full-time	95.6%
Part-time	3.4%
Self-employed	0.6%
Homemaker	0.2%
Retired	0.2%

Many of the group were of managerial level or above, with the largest single group being middle management (41.1%):

Occupational level	Percentage
Top level	5.5%
Senior executive	0.2%
Upper middle management	13.2%
Middle management	41.1%
First level management/supervisor	7.5%
Employee	27.8%
Other	4.7%

A range of work areas were represented:

Work area (job type)	Percentage
Finance	20.9%
IT	11.1%
Admin or secretarial	9.9%
Sales, customer service	9.9%
Science, engineering	8.0%
Education	8.0%
Research and development	7.4%
HR, training, guidance	4.7%
Skilled operative	1.3%
Business services	1.1%
Land, sea or air transport	1.1%
Leisure, personal service	0.9%
Military, police, prison, fire	0.5%
Health, social services, etc.	0.3%
Unskilled operative	0.3%
Other private sector	8.9%
Other public sector	2.4%
Other	3.3%

MBTI® Step I instrument

European Data Supplement

Polish

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Contents

Introduction

The Polish language version of the MBTI Step I questionnaire was developed and trialled during 2007/8. Due to the fact that it is so new, the amount of data collected so far is limited.

However, this chapter contains details of the main analyses conducted during the development process. A brief description of the sample is given below.

- The sample consisted of 271 individuals who completed the MBTI Step I instrument in Polish via the OPPassessment system between June 2007 and April 2008.[1] This sample was gathered by potential users of the instrument in Poland, and contained the kinds of people with whom the Polish MBTI instrument will be used when it is launched.

The results of the analyses are outlined below.

[1] OPPassessment allows personality questionnaires such as the MBTI instrument to be administered via email and/or completed online.

Type distribution

Type tables are a way of illustrating the proportion of each type within a particular group. Opposite are type tables for the Polish sample described on the previous page.

For each of the 16 different types, the number of cases, the percentage of the total that this represents and the self-selection ratio (SSR) are shown. The SSR (Myers et al., 1998) is a way of demonstrating whether a given type appears more or less often in a particular group than would be expected given its frequency in a reference group. An SSR of greater than 1 indicates that a type is over-represented, and an SSR of less than 1 denotes that it is under-represented. Asterisks are used to denote whether the over- or under-representations are statistically significant, based on the results of chi-square analysis[2].

Ideally, the type distribution from a large representative sample of the Polish population would be used to calculate SSRs in this data supplement. However, such a sample does not currently exist. In its place, SSRs have been calculated using type data from the UK general population (Kendall, 1998). Evidence (eg Hackston and Kendall, 2004; Quenk et al., 2004; Kirby, Kendall and Barger, 2007) does suggest that although type-related behaviours vary a good deal from country to country and from culture to culture, the frequencies of underlying MBTI types do not.

[2] Chi-square analysis (often abbreviated to χ^2) is a technique used to explore whether observed frequency distributions differ significantly from other, predefined, distributions. In this case, the UK general population group is used as the reference group, and the chi-square analysis indicates whether the proportion of people of each type within a particular sample differs significantly from the proportion of people reporting the same type within the reference group.

Questionnaire development sample

Table 10.1: Type table for questionnaire development data

Reported type (n=271)

ISTJ	ISFJ	INFJ	INTJ
n=35 12.9% SSR=0.94	n=4 1.5% SSR=0.12**	n=7 2.6% SSR=1.51	n=14 5.2% SSR=3.67**
ISTP	**ISFP**	**INFP**	**INTP**
n=7 2.6% SSR=0.40*	n=2 0.7% SSR=0.12**	n=5 1.8% SSR=0.58	n=9 3.3% SSR=1.36
ESTP	**ESFP**	**ENFP**	**ENTP**
n=17 6.3% SSR=1.08	n=6 2.2% SSR=0.25**	n=19 7.0% SSR=1.11	n=16 5.9% SSR=2.14**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=68 25.1% SSR=2.41**	n=6 2.2% SSR=0.18**	n=19 7.0% SSR=2.55**	n=37 13.7% SSR=4.65**

Type	n	%
E	188	64.9%**
I	83	30.6%**
S	145	53.5%**
N	126	46.5%**
T	203	74.9%**
F	68	25.1%**
J	190	70.1%**
P	81	29.9%**

Best-fit type (n=271)

ISTJ	ISFJ	INFJ	INTJ
n=40 16.1% SSR=1.17	n=14 5.6% SSR=0.44**	n=5 2.0% SSR=1.17	n=11 4.4% SSR=3.14**
ISTP	**ISFP**	**INFP**	**INTP**
n=10 4.0% SSR=0.62	n=15 6.0% SSR=0.98	n=7 2.8% SSR=0.88	n=9 3.6% SSR=1.48
ESTP	**ESFP**	**ENFP**	**ENTP**
n=12 4.8% SSR=0.83	n=15 6.0% SSR=0.69	n=29 11.6% SSR=1.85**	n=25 10.0% SSR=3.65**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=43 17.3% SSR=1.66**	n=7 2.8% SSR=0.22**	n=14 5.6% SSR=2.04*	n=15 6.0% SSR=2.05*

Type	n	%
E	160	59.0%*
I	111	41.0%*
S	156	57.6%**
N	115	42.4%**
T	165	60.9%
F	106	39.1%
J	149	55.0%
P	122	45.0%

For both tables above: *Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

Looking at reported type, the most frequent type preference is quite clearly ESTJ (25% of the total). Overall, the group tends to have a preference for Thinking and Judging, and to a lesser extent for Extraversion and Sensing.

In terms of best-fit type, ESTJ (17%) is also the most frequently occurring type preference. However, the proportion is lower than for reported type, and is closely followed by ISTJ (16%) in terms of frequency. The general pattern is similar to that found with reported type, with the group tending to have a preference for Extraversion, Sensing, Thinking and Judging. A notable difference, however, is that for all dimensions except Sensing–Intuition, the proportion of people with preferences for each pole are more evenly balanced than they are for reported type.

It should be noted that the wider applicability of these type distributions should not be overstated as the samples on which they are based cannot be considered to be representative of any wider group. Further type distribution data will be added to this supplement as it becomes available.

Internal consistency reliability

The reliability of a test or questionnaire relates to how consistent and precise it is. Internal consistency reliability addresses the question of whether all the questions in a scale measure the same construct. A common measure of internal consistency reliability is coefficient alpha (Cronbach, 1951). The alpha coefficients for the Polish questionnaire development sample are shown in Table 10.2.

Table 10.2: Internal consistency reliability

Dimension	Coefficient alpha
E–I	0.86
S–N	0.77
T–F	0.82
J–P	0.80

It is generally agreed that internal consistency reliability should achieve a value of at least 0.7 for a test to be considered to be reliable.[3] On this basis, all of the dimensions of the questionnaire show good reliability.

[3] For example, see Nunnally (1978) or Kline (2000).

Intercorrelations between MBTI dimensions

One of the original aims of developing the MBTI questionnaire was to see if dimensions could be produced that were independent of each other. Results from other language versions have shown that this was achieved with all dimensions except Sensing–Intuition and Judging–Perceiving. This shows up despite the fact that questions were carefully chosen to sort on only one dimension. The author of the questionnaire hypothesised that the S–N/J–P relationship may simply be a reflection of reality rather than a failing in the construction of the questionnaire.

The intercorrelations between dimensions amongst the OPPassessment sample are shown in Table 10.3. In order to be able to calculate the correlations, scores on each dimension were converted to continuous scores.[4]

Table 10.3: Intercorrelations between dimensions

	E–I	S–N	T–F	J–P
E–I		–0.10	–0.16**	–0.06
S–N			0.36**	0.32**
T–F				0.23**
J–P				

**Significant at p<0.01.

The S–N/J–P relationship that has been found with other language versions has been replicated, showing that a preference for Sensing is likely to be associated with a preference for Judging, and that a preference for Intuition is likely to be associated with a preference for Perceiving.

In addition, for this sample, S–N has also been shown to correlate reasonably highly with T–F, suggesting that a preference for Sensing is likely to be associated with a preference for Thinking, and that a preference for Intuition is likely to be associated with a preference for Feeling. At present, we do not have sufficient data to know whether this reflects a true relationship amongst people who take the Polish questionnaire, or whether the finding is sample-specific. This will be explored once more data become available.

[4] Continuous scores (Myers and McCaulley, 1985, p. 9) place an individual's score on each dimension onto a continuous scale with a mid-point of 100. To calculate continuous scores, Preference Clarity Index (PCI) scores for each dimension are either subtracted or added to 100, depending on which direction the overall preference is. PCI scores in the direction of E, S, T or J are subtracted from 100. PCI scores in the direction of I, N, F or P are added to 100.

Validity: the accuracy of the Polish MBTI Step I instrument in predicting best-fit type

The purpose of the MBTI instrument is to help individuals to establish their validated or 'best-fit' psychological type. A key measure of the validity of the instrument is, therefore, how well the results relate to best-fit (validated) type. These data are useful to practitioners in knowing how typically accurate the reported result is likely to be.

Best-fit data are available for a sample of MBTI practitioners who took part in a research study to look at the relationship between MBTI reported type and best-fit type.

Table 10.4 presents the results of the analysis comparing best-fit with reported type. The Polish questionnaire performs in a similar way to other language versions for which best-fit data are available, and there is good evidence for the accuracy of the instrument. In nearly 50% of cases, a respondent's reported type will match their best-fit type, and in nearly 80% of cases at least three of the four preferences will match.

Table 10.4: Match of reported and best-fit type

	Polish questionnaire development sample (n=271)	
Agrees with all four letters	48.3%	78.9%
Agrees with three letters	30.6%	
Agrees with two letters	16.2%	21.1%
Agrees with one letter	4.1%	
Agrees with no letters	0.8%	

Dimension	Percentage agreement
E–I	84.5%
S–N	81.2%
T–F	79.3%
J–P	76.8%

Further analysis was carried out to investigate the validity and accuracy of the questionnaire. MBTI qualifying training course delegates and MBTI practitioners were asked how confident they felt about their results on each type dichotomy (on a scale from 1 to 5, where 5 indicated the highest degree of confidence). For every dimension, more than two-thirds of the group were confident about their type.

All these figures provide further support for the validity of the MBTI approach. Detailed results are shown in Table 10.5.

Table 10.5: Degree of confidence in results

Degree of confidence	Percentage of group			
	E–I	S–N	T–F	J–P
5 (highest)	44%	31%	38%	40%
4	31%	38%	34%	30%
3	18%	26%	22%	22%
2	6%	4%	4%	7%
1 (lowest)	1%	1%	2%	1%
Percentage at 4 or above	*75%*	*69%*	*72%*	*70%*

In summary, there is good evidence for the validity of the Polish MBTI Step I instrument. Specifically:

- There is a high level of agreement between best-fit and reported type, comparable with results for other European language versions.
- Respondents are confident about their results.

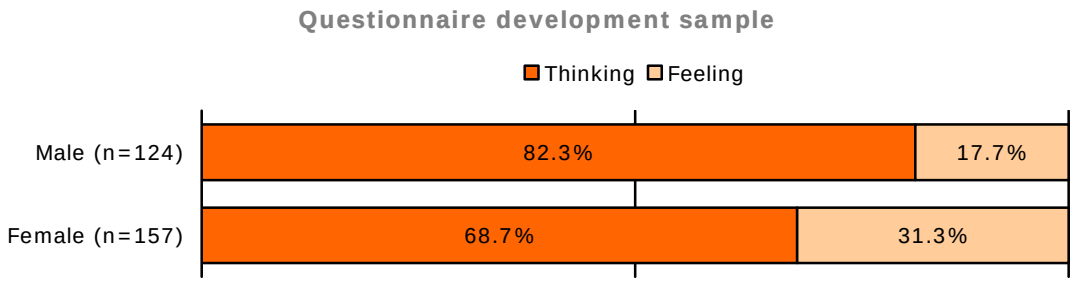
Group differences in type

Various types of demographic information were collected for the Polish questionnaire development sample. The relationship of MBTI type to each of these factors is described below.

Gender

Most groups who take the MBTI questionnaire show a significant gender difference on the Thinking–Feeling dimension, and this is the case for the group in this study, as shown in Figure 10.1.[5]

Figure 10.1: Gender differences on the T–F dimension



When compared with the T–F distribution in the combined sample, Thinking preferences are over-represented amongst men and Feeling preferences are over-represented amongst women (although even amongst women in this group there are more people with a preference for Thinking than Feeling). This effect has been found many times with many different versions of the instrument in a number of different cultures.

Age

Previous research using UK Step I continuous scores has shown significant correlations between age and three of the four dimensions (Warr, Miles and Platts, 2001). Older people were more likely than younger people to have preferences for Introversion, Sensing and Judging.

The data in this supplement were analysed in a slightly different way, by looking for differences in average age between people with preferences for Extraversion versus those with preferences for Introversion, for Sensing versus Intuition, for Thinking versus Feeling and for Judging versus Perceiving. The sample showed statistically significant relationships between age and two of the dimensions,[6] as shown in Table 10.6. The mean age of people with a preference for

[5] $\chi^2=6.57$; significant at $p<0.01$.
[6] Independent-samples t-tests; SN significant at $p<0.01$, JP significant at $p<0.001$.

Sensing was approximately three and a half years higher than of those with a preference for Intuition. The mean age of those with a preference for Judging was approximately four and a half years higher than of those with a preference for Perceiving.

Table 10.6: Significant mean age differences

	Sensing	Intuition	Difference	Significance
Mean age (years)	32.56	29.19	3.37	**

	Judging	Perceiving	Difference	Significance
Mean age (years)	32.20	27.82	4.38	***

Difference significant at: *p<0.05, **p<0.01, ***p<0.001.

Occupational level

Previous research in other countries has demonstrated that individuals in higher level jobs in organisations are more likely to have preferences for Intuition and for Thinking than those in lower level jobs (Quenk, Hammer and Majors, 2004).

The sample used in the development of the Polish questionnaire was not large enough to explore this fully. Although many of the respondents did describe their occupational level, the number of individuals in each category was too small for a full analysis. Therefore, the categories were recoded into two broader groups, namely 'employee' (containing 55 people) and 'supervisory or above' (72 people). However, when these two groups were compared, no significant differences were found for any of the dimensions. A further analysis when more data become available will allow us to explore this further.

Education

Specific educational qualifications were not available for the sample; however, the age at which individuals left full-time education was. There was found to be a link between the Thinking–Feeling dimension and the age at which individuals left full-time education. On average, people with preferences for Thinking left education approximately two and a half years later than those with a preference for Feeling.

Work area

Previous research into MBTI type suggests that an individual's type influences their choice of career (Hammer, 1998). However, the number of different work areas covered by this sample was so broad

that the number of people in each category was too small for analyses to be conducted. This is another example of where further analysis will be conducted when more data become available.

Nationality

Nationality was disclosed by 76% of the sample. Of these, 97% were Polish. No other nationality was represented in sufficiently large numbers for an analysis of type differences by nationality to be conducted.

Employment status

Employment status (ie whether a person works full-time, part-time, is self-employed, etc) was found to show no significant relationship with type preferences amongst this sample.

Appendix 1: Sample description

Sample 1: Questionnaire development sample

This sample consists of 271 individuals who completed the MBTI Step I questionnaire in Polish via the OPPassessment system between June 2007 and April 2008. Of these individuals, 54% were female and 46% were male. Age ranged from 16 to 60 years, with a mean of 31 and a median of 29.

Nationality was disclosed by 76% of respondents. Of these, 97% were Polish. No other individual nationality was represented in large numbers.

Nationality	Percentage
Polish	97.1%
Other	2.9%

The majority of those who disclosed their employment status were in full-time employment:

Employment status	Percentage
Full-time	44.0%
Part-time	5.5%
Self-employed	6.6%
Unemployed	5.5%
Retired	0.4%
Homemaker	0.0%
Not disclosed	38.0%

Of those who disclosed their occupational level, many were of managerial level or above, although the largest single group was employee level (20.3%):

Occupational level	Percentage
Top level	3.7%
Senior executive	9.2%
Upper middle management	0.4%
Middle management	4.8%
First-level management/supervisor	8.5%
Employee	20.3%
Other	12.2%
Not disclosed	40.9%

A range of work areas were represented:

Work area (job type)	Percentage
Sales, customer service	12.2%
Finance	11.4%
HR, training, guidance	5.2%
Admin or secretarial	3.3%
Health, social services, etc	1.8%
IT	1.8%
Education	1.8%
Science, engineering	1.5%
Research and development	1.1%
Military, police, prison, fire	0.4%
Skilled operative	0.4%
Land, sea or air transport	0.4%
Unskilled operative	0.0%
Business services	0.0%
Leisure, personal service	0.0%
Other public sector	0.4%
Other private sector	4.4%
Other	10.0%
Not disclosed	38.7%

MBTI® Step I instrument

European Data Supplement

Russian

February 2011

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Contents

Introduction

The Russian-language version of the MBTI Step I questionnaire was developed and trialled between 2006 and 2010. Because it is so new, the amount of data collected so far is limited.

However, this chapter contains details of the main analyses conducted during the development process. A brief description of the sample is given below.

- The sample consisted of 201 individuals who completed the MBTI Step I instrument in Russian via the OPPassessment system between January 2007 and November 2009.[1] This sample was gathered by potential users of the instrument in Russia, and contained the kinds of people with whom the Russian MBTI instrument will be used when it is launched.

The results of the analyses are outlined below.

[1] OPPassessment allows personality questionnaires such as the MBTI instrument to be administered via email and/or completed online.

Type distribution

Type tables are a way of illustrating the proportion of each type within a particular group. Opposite are type tables for the Russian sample described on the previous page.

For each of the 16 different types, the number of cases, the percentage of the total that this represents and the self-selection ratio (SSR) are shown. The SSR (Myers et al., 1998) is a way of demonstrating whether a given type appears more or less often in a particular group than would be expected given its frequency in a reference group. An SSR of greater than 1 indicates that a type is over-represented, and an SSR of less than 1 denotes that it is under-represented. Asterisks are used to denote whether the over- or under-representations are statistically significant, based on the results of chi-square analysis[2].

Ideally, the type distribution from a large representative sample of the Russian population would be used to calculate SSRs in this data supplement. However, such a sample does not currently exist. In its place, SSRs have been calculated using type data from the UK general population (Kendall, 1998). Evidence (eg Hackston and Kendall, 2004; Quenk et al., 2004; Kirby, Kendall and Barger, 2007) does suggest that although type-related behaviours vary a good deal from country to country and from culture to culture, the frequencies of underlying MBTI types do not.

[2] Chi-square analysis (often abbreviated to χ^2) is a technique used to explore whether observed frequency distributions differ significantly from other, predefined, distributions. In this case, the UK general population group is used as the reference group, and the chi-square analysis indicates whether the proportion of people of each type within a particular sample differs significantly from the proportion of people reporting the same type within the reference group.

Questionnaire development sample

Table 11.1: Type table for questionnaire development data

Reported type (n=201)

ISTJ	ISFJ	INFJ	INTJ
n=31 15.4% SSR=1.13	n=6 3.0% SSR=0.23**	n=6 3.0% SSR=1.74	n=12 6.0% SSR=4.24**
ISTP	**ISFP**	**INFP**	**INTP**
n=5 2.5% SSR=0.39*	n=1 0.5% SSR=0.08**	n=3 1.5% SSR=0.47	n=4 2.0% SSR=0.81
ESTP	**ESFP**	**ENFP**	**ENTP**
n=3 1.5% SSR=0.26*	n=4 2.0% SSR=0.23**	n=4 2.0% SSR=0.32*	n=11 5.5% SSR=1.99*
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=47 23.4% SSR=2.25**	n=14 7.0% SSR=0.55*	n=10 5.0% SSR=1.81	n=40 19.9% SSR=6.77**

Type	n	%
E	133	66.2%**
I	68	33.8%**
S	111	55.2%**
N	90	44.8%**
T	153	76.1%**
F	48	23.9%**
J	166	82.6%**
P	35	17.4%**

Best-fit type (n=201)

ISTJ	ISFJ	INFJ	INTJ
n=24 11.9% SSR=0.87	n=9 4.5% SSR=0.35**	n=6 3.0% SSR=1.74	n=9 4.5% SSR=3.18**
ISTP	**ISFP**	**INFP**	**INTP**
n=6 3.0% SSR=0.46	n=7 3.5% SSR=0.57	n=5 2.5% SSR=0.78	n=7 3.5% SSR=1.42
ESTP	**ESFP**	**ENFP**	**ENTP**
n=6 3.0% SSR=0.51	n=5 2.5% SSR=0.29**	n=18 9.0% SSR=1.42	n=14 7.0% SSR=2.53**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=38 18.9% SSR=1.82**	n=12 6.0% SSR=0.47**	n=7 3.5% SSR=1.26	n=28 13.9% SSR=4.74**

Type	n	%
E	128	63.7%**
I	73	36.3%**
S	107	53.2%**
N	94	46.8%**
T	132	65.7%**
F	69	34.3%**
J	133	66.2%*
P	68	33.8%*

For both tables above: *Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

Looking at reported type, the most frequent type preference is ESTJ (23% of the total), followed by ENTJ (20%). Overall, the group tends to have a preference for Judging and Thinking, and to a lesser extent for Extraversion and Sensing.

In terms of best-fit type, ESTJ (19%) and ENTJ (14%) are also the most frequently occurring type preferences. However, the proportions are lower than for reported type. The general pattern is similar to that found with reported type, with the group tending to have a preference for Extraversion, Sensing, Thinking and Judging. A notable difference, however, is that for all dimensions, the proportion of people with preferences for each pole are more evenly balanced than they are for reported type.

It should be noted that the wider applicability of these type distributions should not be overstated as the samples on which they are based cannot be considered to be representative of any wider group. Further type distribution data will be added to this supplement as it becomes available.

Internal consistency reliability

The reliability of a test or questionnaire relates to how consistent and precise it is. Internal consistency reliability addresses the question of whether all the questions in a scale measure the same construct. A common measure of internal consistency reliability is coefficient alpha (Cronbach, 1951). The alpha coefficients for the Russian questionnaire development sample are shown in Table 11.2.

Table 11.2: Internal consistency reliability

Dimension	Coefficient alpha
E–I	0.77
S–N	0.71
T–F	0.76
J–P	0.80

It is generally agreed that internal consistency reliability should achieve a value of at least 0.7 for a test to be considered to be reliable.[3] On this basis, all of the dimensions of the questionnaire show good reliability.

[3] For example, see Nunnally (1978) or Kline (2000).

Intercorrelations between MBTI dimensions

One of the original aims of developing the MBTI questionnaire was to see if dimensions could be produced that were independent of each other. Results from other language versions have shown that this was achieved with all dimensions except Sensing–Intuition and Judging–Perceiving. This shows up despite the fact that questions were carefully chosen to sort on only one dimension. The author of the questionnaire hypothesised that the S–N/J–P relationship may simply be a reflection of reality rather than a failing in the construction of the questionnaire.

The intercorrelations between dimensions amongst the OPPassessment sample are shown in Table 11.3. In order to be able to calculate the correlations, scores on each dimension were converted to continuous scores.[4]

Table 11.3: Intercorrelations between dimensions

	E–I	S–N	T–F	J–P
E–I		–0.16*	–0.10	–0.02
S–N			0.19**	0.28**
T–F				0.22**
J–P				

**Significant at *p<0.05, **p<0.01.

The S–N/J–P relationship that has been found with other language versions has been replicated, showing that a preference for Sensing is likely to be associated with a preference for Judging, and that a preference for Intuition is likely to be associated with a preference for Perceiving.

In addition, for this sample, S–N has also been shown to correlate reasonably highly with T–F, suggesting that a preference for Sensing is likely to be associated with a preference for Thinking, and that a preference for Intuition is likely to be associated with a preference for Feeling. Similarly, J–P has been shown to correlate reasonably highly with T–F, suggesting that a preference for Judging is likely to be associated with a preference for Thinking, and that a preference for Perceiving is likely to be associated with a preference for Feeling.

At present, we do not have sufficient data to know whether these reflect a true relationship amongst people who take the Russian questionnaire, or whether the findings are sample-specific. This will be explored once more data become available.

[4] Continuous scores (Myers and McCaulley, 1985, p. 9) place an individual's score on each dimension onto a continuous scale with a mid-point of 100. To calculate continuous scores, Preference Clarity Index (PCI) scores for each dimension are either subtracted or added to 100, depending on which direction the overall preference is. PCI scores in the direction of E, S, T or J are subtracted from 100. PCI scores in the direction of I, N, F or P are added to 100.

Validity: the accuracy of the Russian MBTI Step I instrument in predicting best-fit type

The purpose of the MBTI instrument is to help individuals to establish their validated or 'best-fit' psychological type. A key measure of the validity of the instrument is, therefore, how well the results relate to best-fit (validated) type. These data are useful to practitioners in knowing how typically accurate the reported result is likely to be.

Best-fit data are available for a sample of people who took part in a research study to look at the relationship between MBTI reported type and best-fit type.

Table 11.4 presents the results of the analysis comparing best-fit with reported type. The Russian questionnaire performs in a similar way to other language versions for which best-fit data are available, and there is good evidence for the accuracy of the instrument. In nearly 60% of cases, a respondent's reported type will match their best-fit type, and in nearly 85% of cases at least three of the four preferences will match.

Table 11.4: Match of reported and best-fit type

	Russian questionnaire development sample (n=201)	
Agrees with all four letters	57.7%	84.6%
Agrees with three letters	26.9%	
Agrees with two letters	10.4%	15.4%
Agrees with one letter	4.5%	
Agrees with no letters	0.5%	

Dimension	Percentage agreement
E–I	89.6%
S–N	86.1%
T–F	79.6%
J–P	81.6%

Further analysis was carried out to investigate the validity and accuracy of the questionnaire. People who took the questionnaire were asked how confident they felt about their results on each type dichotomy (on a scale from 1 to 5, where 5 indicated the highest degree of confidence). For every dimension, nearly three-quarters of the group were confident about their type.

All these figures provide further support for the validity of the MBTI approach. Detailed results are shown in Table 11.5.

Table 11.5: Degree of confidence in results

Degree of confidence	Percentage of group			
	E–I	S–N	T–F	J–P
5 (highest)	46%	34%	36%	46%
4	26%	39%	38%	27%
3	16%	16%	14%	22%
2	7%	9%	11%	5%
1 (lowest)	4%	2%	2%	1%
Percentage at 4 or above	*72%*	*73%*	*74%*	*73%*

In summary, there is good evidence for the validity of the Russian MBTI Step I instrument. Specifically:

- There is a high level of agreement between best-fit and reported type, comparable with results for other European language versions.
- Respondents are confident about their results.

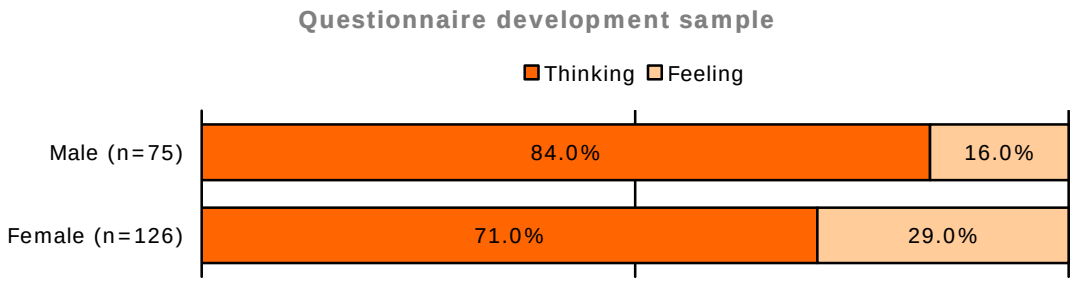
Group differences in type

Various types of demographic information were collected for the Russian questionnaire development sample. The relationship of MBTI type to each of these factors is described below.

Gender

Most groups who take the MBTI questionnaire show a significant gender difference on the Thinking–Feeling dimension, and this is the case for the group in this study, as shown in Figure 11.1.[5]

Figure 11.1: Gender differences on the T–F dimension



When compared with the T–F distribution in the combined sample (shown on page 257), Thinking preferences are over-represented amongst men and Feeling preferences are over-represented amongst women (although even amongst women in this group there are more people with a preference for Thinking than Feeling). This effect has been found many times with many different versions of the instrument in a number of different cultures.

Age

Previous research using UK Step I continuous scores has shown significant correlations between age and three of the four dimensions (Warr, Miles and Platts, 2001). Older people were more likely than younger people to have preferences for Introversion, Sensing and Judging.

The data in this supplement were analysed in a slightly different way, by looking for differences in average age between people with preferences for Extraversion versus those with preferences for Introversion, for Sensing versus Intuition, for Thinking versus Feeling and for Judging versus Perceiving.

[5] $\chi^2=4.09$; significant at $p<0.05$.

The sample showed no statistically significant relationships between age and any of the dimensions. A further analysis when more data become available will allow us to explore this further.

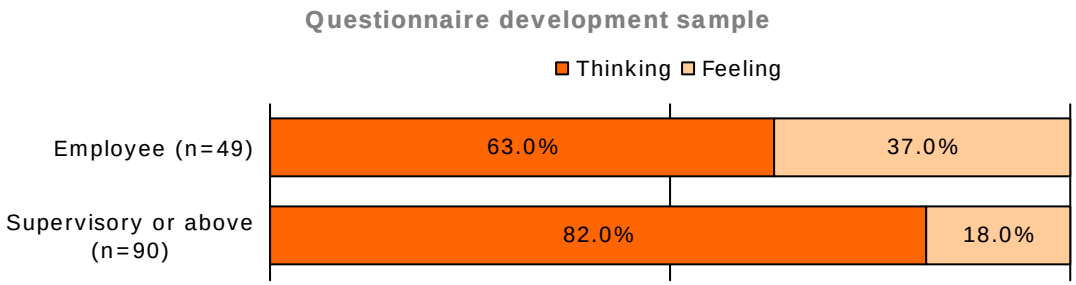
Occupational level

Previous research in other countries has demonstrated that individuals in higher level jobs in organisations are more likely to have preferences for Intuition and for Thinking than those in lower level jobs (Quenk, Hammer and Majors, 2004).

The sample used in the development of the Russian questionnaire was not large enough to explore this fully. Although many of the respondents did describe their occupational level, the number of individuals in each category was too small for a full analysis. Therefore, the categories were recoded into two broader groups, namely 'employee' (containing 49 people) and 'supervisory or above' (90 people).

When these two groups were compared, significant differences were only found for the Thinking–Feeling dimension, as shown in Figure 11.2.[6]

Figure 11.2: Occupational level differences on the T–F dimension



Again, when compared to the combined sample, Thinking preferences are over-represented amongst individuals in higher level jobs and Feeling preferences are over-represented amongst people in lower level jobs.

Education

Specific educational qualifications were not available for the sample; however, the age at which individuals left full-time education was. There were found to be no links between MBTI dimensions and the age at which individuals left full-time education.

[6] $\chi^2=6.17$; significant at $p<0.05$.

Work area

Previous research into MBTI type suggests that an individual's type influences their choice of career (Hammer, 1998). However, the number of different work areas covered by this sample was so broad that the number of people in each category was too small for analyses to be conducted. This is another example of where further analysis will be conducted when more data become available.

Nationality

Nationality was disclosed by 90% of the sample. Of these, 92% were Russian. No other nationality was represented in sufficiently large numbers for an analysis of type differences by nationality to be conducted.

Employment status

Employment status (ie whether a person works full-time, part-time, is self-employed, etc) was disclosed by 82% of the sample. Of these, 96% were working full-time. No other employment status was represented in sufficiently large numbers for an analysis of type differences by employment status to be conducted.

Appendix 1: Sample description

Sample 1: Questionnaire development sample

This sample consists of 201 individuals who completed the MBTI Step I questionnaire in Russian via the OPPassessment system between January 2007 and November 2009. Of these individuals, 63% were female and 37% were male. Age ranged from 20 to 69 years, with a mean and median of 33.

Nationality was disclosed by 90% of respondents. Of these, 92% were Russian. No other individual nationality was represented in large numbers.

Nationality	Percentage
Russian	91.6%
Other	8.4%

The majority of those who disclosed their employment status were in full-time employment:

Employment status	Percentage
Full-time	78.6%
Part-time	1.5%
Self-employed	0.5%
Retired	0.5%
Homemaker	0.5%
Unemployed	0.0%
Not disclosed	18.4%

Of those who disclosed their occupational level, many were of managerial level or above, although the largest single group was employee level (24.4%):

Occupational level	Percentage
Top level	9.5%
Senior executive	2.5%
Upper middle management	11.9%
Middle management	13.4%
First-level management/supervisor	7.5%
Employee	24.4%
Other	6.5%
Not disclosed	24.4%

A range of work areas were represented:

Work area (job type)	Percentage
Sales, customer service	13.9%
Finance	11.9%
HR, training, guidance	9.0%
Admin or secretarial	9.0%
Science, engineering	8.0%
Health, social services, etc	6.5%
IT	3.0%
Research and development	2.5%
Business services	2.5%
Leisure, personal service	2.0%
Education	1.0%
Other public sector	1.0%
Other private sector	0.5%
Military, police, prison, fire	0.0%
Skilled operative	0.0%
Land, sea or air transport	0.0%
Unskilled operative	0.0%
Other	8.5%
Not disclosed	20.9%

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Contents

Introduction

Data collected from the Spanish version of the MBTI Step I questionnaire were analysed to produce the findings in this supplement. Brief descriptions of the two samples are given below, with further details provided in Appendix 1.

- A group of 1,527 individuals who completed the MBTI Step I questionnaire in Spanish via the OPPassessment system between 2004 and mid-2008.[1] This sample is considered to be representative of the groups of people with whom the Spanish MBTI instrument has been and will be used for applications such as management development, coaching, counselling and teambuilding. As such, it is likely to represent a cross-section of the Spanish-speaking professional and managerial population.

- A group of 128 Spanish participants on management development programmes at Ashridge Business School, run between 2000 and 2003.[2]

The results of the analyses are outlined below.

[1] OPPassessment allows personality questionnaires such as the MBTI instrument to be administered via email and/or completed online.
[2] Data reproduced with kind permission from Ashridge Business School.

Type distribution

Type tables are a way of illustrating the proportion of each type within a particular group. Opposite are type tables for the Spanish samples described on the previous page.

For each of the 16 different types, the number of cases, the percentage of the total that this represents and the self-selection ratio (SSR) are shown. The SSR (Myers et al., 1998) is a way of demonstrating whether a given type appears more or less often in a particular group than would be expected given its frequency in a reference group. An SSR of greater than 1 indicates that a type is over-represented, and an SSR of less than 1 denotes that it is under-represented. Asterisks are used to denote whether the over- or under-representations are statistically significant, based on the results of chi-square analysis.[3]

Ideally, the type distribution from a large representative sample of the Spanish population would be used to calculate SSRs in this data supplement. However, such a sample does not currently exist. In its place, SSRs have been calculated using type data from the UK general population (Kendall, 1998), which can be justified by the fact that type distributions for comparable Spanish and British groups, such as managers and professionals, are similar. Evidence (eg Hackston and Kendall, 2004; Quenk et al., 2004; Kirby, Kendall and Barger, 2007) does suggest that although type-related behaviours vary a good deal from country to country and from culture to culture, the frequencies of underlying MBTI types do not.

[3] Chi-square analysis (often abbreviated to χ^2) is a technique used to explore whether observed frequency distributions differ significantly from other, predefined, distributions. In this case, the UK general population group is used as the reference group, and the chi-square analysis indicates whether the proportion of people of each type within a particular sample differs significantly from the proportion of people reporting the same type within the reference group.

OPPassessment data (representative Spanish-speaking professional and managerial sample)

Table 12.1: Type table for OPPassessment Data (reported type, n=1,527)

ISTJ	ISFJ	INFJ	INTJ
n=185 12.1% SSR=0.88	n=15 1.0% SSR=0.08**	n=8 0.5% SSR=0.31**	n=69 4.5% SSR=3.21**
ISTP	**ISFP**	**INFP**	**INTP**
n=37 2.4% SSR=0.38**	n=3 0.2% SSR=0.03**	n=7 0.5% SSR=0.14**	n=43 2.8% SSR=1.15
ESTP	**ESFP**	**ENFP**	**ENTP**
n=100 6.5% SSR=1.13	n=13 0.9% SSR=0.10**	n=21 1.4% SSR=0.22**	n=139 9.1% SSR=3.31**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=565 37.0% SSR=3.56**	n=29 1.9% SSR=0.15**	n=22 1.4% SSR=0.52*	n=271 17.7% SSR=6.04**

Type	n	%
E	1,160	76.0%**
I	367	24.0%**
S	947	62.0%**
N	580	38.0%**
T	1,409	92.3%**
F	118	7.7%**
J	1,164	76.2%**
P	363	23.8%**

*Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

The most common single type preference is ESTJ (37% of the total), followed by ENTJ (18%); this is a common finding with managerial groups in other countries. The SSR results suggest that, in comparison with the UK general population, those with preferences for NT are over-represented (with the exception of INTP), and those with preferences for F are under-represented. Again, this is a common finding with managerial groups, although it is often more specifically the SF preference that tends to be under-represented.

Management development programme participants

Table 12.2: Type table for management development programme participants (reported type, n=128)

ISTJ	ISFJ	INFJ	INTJ
n=21 16.4% SSR=1.20	n=1 0.8% SSR=0.06**	n=1 0.8% SSR=0.46	n=6 4.7% SSR=3.33**
ISTP	**ISFP**	**INFP**	**INTP**
n=8 6.3% SSR=0.97	n=1 0.8% SSR=0.13*	n=1 0.8% SSR=0.25	n=3 2.3% SSR=0.96
ESTP	**ESFP**	**ENFP**	**ENTP**
n=10 7.8% SSR=1.34	n=0 0.0% SSR=0.00**	n=1 0.8% SSR=0.12*	n=15 11.7% SSR=4.26**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=39 30.5% SSR=2.93**	n=1 0.8% SSR=0.06**	n=3 2.3% SSR=0.85	n=17 13.3% SSR=4.52**

Type	n	%
E	86	67.2%**
I	42	32.8%**
S	81	63.3%**
N	47	36.7%**
T	119	93.0%**
F	9	7.0%**
J	89	69.5%*
P	39	30.5%*

*Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

The type distribution is similar to that for the OPPassessment sample described earlier, with ESTJ (31% of the total) being the most common single type preference, and NT being over-represented (with the exception of INTP) and SF being under-represented.

Internal consistency reliability

The reliability of a test or questionnaire relates to how consistent and precise it is. Internal consistency reliability addresses the question of whether all the questions in a scale measure the same construct. A common measure of internal consistency reliability is coefficient alpha (Cronbach, 1951). The alpha coefficients for the Spanish OPPassessment sample are shown in Table 12.3.

Table 12.3: Internal consistency reliability

Dimension	Coefficient alpha
E–I	0.83
S–N	0.79
T–F	0.73
J–P	0.79

It is generally agreed that internal consistency reliability should achieve a value of at least 0.7 for a test to be considered to be reliable.[4] On this basis, all of the dimensions of the questionnaire show good reliability. In addition, the alpha coefficients have been found to be consistent across different age groups and across males and females.

[4] For example, see Nunnally (1978) or Kline (2000).

Intercorrelations between MBTI dimensions

One of the original aims of developing the MBTI questionnaire was to see if dimensions could be produced that were independent of each other. Results from other language versions have shown that this was achieved with all dimensions except Sensing–Intuition and Judging–Perceiving. This shows up despite the fact that questions were carefully chosen to sort on only one dimension. The author of the questionnaire hypothesised that the S–N/J–P relationship may simply be a reflection of reality rather than a failing in the construction of the questionnaire.

The intercorrelations between dimensions amongst the OPPassessment sample are shown in Table 11.4. In order to be able to calculate the correlations, scores on each dimension were converted to continuous scores.[5]

Table 12.4: Intercorrelations between dimensions

	E–I	S–N	T–F	J–P
E–I		–0.06*	–0.07**	–0.01
S–N			0.17**	0.40**
T–F				0.19**
J–P				

Significant at: *p<0.05, **p<0.01.

Although statistically significant, only very low correlations were found between most of the dimensions. The S–N/J–P relationship that has been found with other language versions has been replicated, showing that a preference for Sensing is likely to be associated with a preference for Judging, and that a preference for Intuition is likely to be associated with a preference for Perceiving.

[5] Continuous scores (Myers and McCaulley, 1985, p. 9) place an individual's score on each dimension onto a continuous scale with a mid-point of 100. To calculate continuous scores, Preference Clarity Index (PCI) scores for each dimension are either subtracted or added to 100, depending on which direction the overall preference is. PCI scores in the direction of E, S, T or J are subtracted from 100. PCI scores in the direction of I, N, F or P are added to 100.

Validity: the accuracy of the Spanish MBTI Step I instrument in predicting best-fit type

At present, insufficient data have been collected for the Spanish language version to be able to report any best-fit validity results.

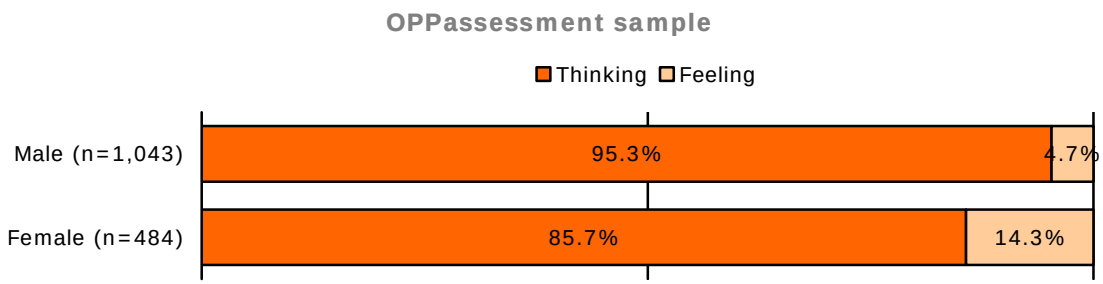
Group differences in type

Various types of demographic information were collected for the OPPassessment sample. The relationship of MBTI type to each of these factors is described below.

Gender

Most groups who take the MBTI questionnaire show a significant gender difference on the Thinking–Feeling dimension, and this is the case for the group in this study, as shown in Figure 12.1.[6]

Figure 12.1: Gender differences on the T–F dimension

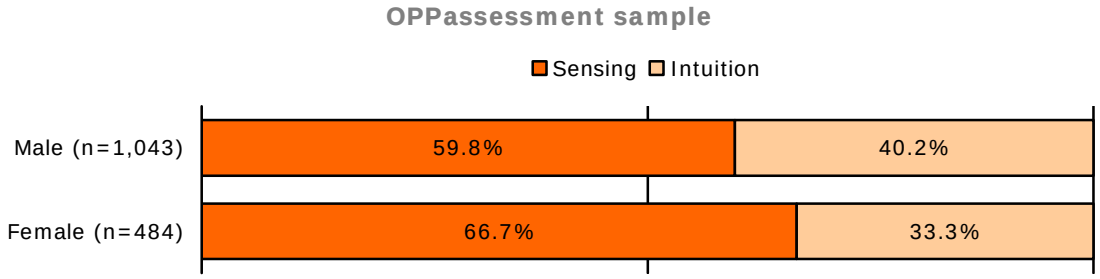


Thinking preferences are over-represented amongst men and Feeling preferences are over-represented amongst women (although even amongst women in this group there are considerably more individuals with a preference for Thinking than for Feeling). This effect has been found many times with many different versions of the instrument in a number of different cultures.

For this group, there were also significant gender differences on the Sensing–Intuition dimension, as shown in Figure 11.2.[7] Sensing preferences are over-represented amongst women and Intuition preferences are over-represented amongst men.

[6] $\chi^2=42.36$; significant at $p<0.001$.
[7] $\chi^2=6.70$; significant at $p<0.01$.

Figure 12.2: Gender differences on the S–N dimension



Age

Previous research using UK Step I continuous scores has shown significant correlations between age and three of the four dimensions (Warr, Miles and Platts, 2001). Older people were more likely than younger people to have preferences for Introversion, Sensing and Judging.

The data in this supplement were analysed in a slightly different way, by looking for differences in average age between people with preferences for Extraversion versus those with preferences for Introversion, Sensing versus Intuition, Thinking versus Feeling and Judging versus Perceiving. The OPPassessment sample showed a statistically significant relationship between age and two of the dimensions,[8] as shown in Table 12.5. The mean age of people with a preference for Introversion and/or Judging was between one and one and a half years higher than of those with a preference for Extraversion and/or Perceiving.

Table 12.5: Significant mean age differences

	Extraversion	Introversion	Difference	Significance
Mean age (years)	36.61	37.99	1.38	**

	Judging	Perceiving	Difference	Significance
Mean age (years)	37.23	36.02	1.21	*

Difference significant at: *p<0.05, **p<0.01, ***p<0.001.

[8] Independent-samples t-test; EI significant at p<0.01, JP significant at p<0.05.

Occupational level

Previous research in other countries has demonstrated that individuals in higher level jobs in organisations are more likely to have preferences for Intuition and for Thinking than those in lower level jobs (Quenk, Hammer and Majors, 2004). However, this was not found to be the case amongst the Spanish OPPassessment sample. There were no significant differences between occupational levels on any of the dimensions.

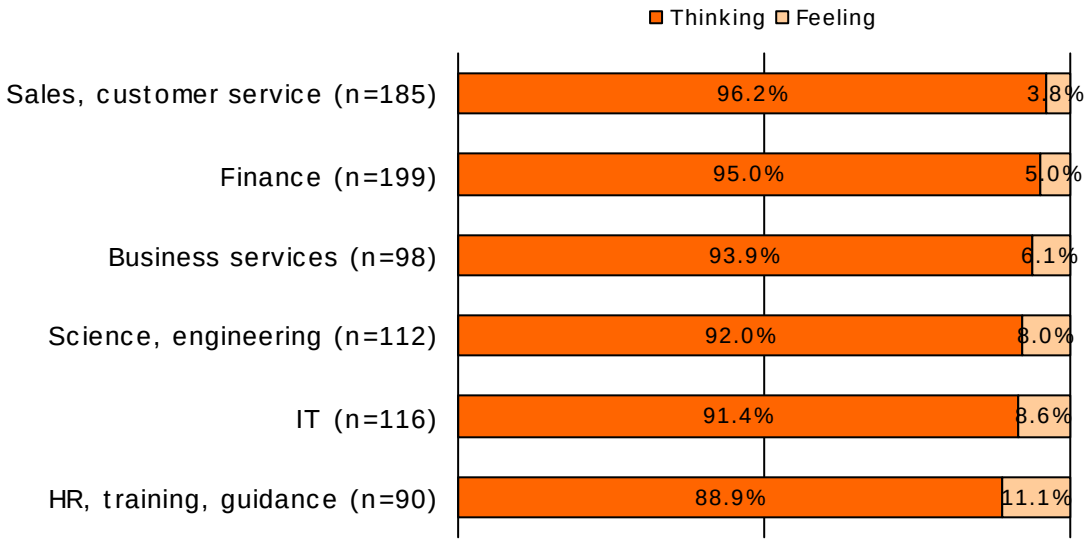
Education

Specific educational qualifications were not available for the OPPassessment sample; however, the age at which individuals left full-time education was. There was found to be no link between any of the dimensions and the age at which individuals left full-time education.

Work area

Previous research into MBTI type suggests that an individual's type influences their choice of career (Hammer, 1998). For this sample, there is a statistically significant relationship between only the Thinking–Feeling dimension and work area. In the figure below, categories have been re-ordered according to the percentage of Thinking types, and work areas with fewer than 90 respondents have been omitted (as well as undefined work areas such as 'Other').

Figure 12.3: Thinking–Feeling[9] and work area



[9] $\chi^2=31.56$; significant at $p<0.05$.

Nationality

Information on nationality was available for the OPPassessment group. Seventy-nine per cent of the group were Spanish, and 16% described their nationality as 'Other'. The remaining 5% were split amongst various European nationalities. However, no other nationality was represented in sufficiently large numbers for an analysis of type differences by nationality to be conducted.

Employment status

Employment status has often been found to show a relationship with MBTI dimensions in other language versions. However, amongst the Spanish-speaking sample, 97% of the group reported that they worked full-time. There were insufficient numbers of people who worked part-time or were self-employed for any group-level analyses to be conducted. Once additional data become available it will be possible to conduct this analysis.

Appendix 1: Sample description

Sample 1: Data from OPPassessment (representative Spanish-speaking professional and managerial sample)

This sample consists of 1,527 individuals who completed the MBTI Step I instrument in Spanish via the OPPassessment system between 2004 and mid-2008. Sixty-eight per cent of the respondents were male and 32% were female. Age ranged from 19 to 69 years, with a mean of 37 and a median of 36.

Nationality was disclosed by 85% of respondents. Of these, 79% were Spanish. No other individual nationality was represented in large numbers.

Nationality	Percentage
Spanish	79.4%
Other	20.6%

The majority of the group were in full-time employment:

Employment status	Percentage
Full-time	97.0%
Part-time	1.7%
Self-employed	0.9%
Unemployed	0.3%
Retired	0.2%

Many of the group were of managerial level or above, but with the largest single group being employee (21.6%):

Occupational level	Percentage
Top level	4.7%
Senior executive	14.0%
Upper middle management	17.8%
Middle management	17.7%
First level management/supervisor	17.5%
Employee	21.6%
Other	6.9%

A range of work areas were represented:

Work area (job type)	Percentage
Finance	18.3%
Sales, customer service	16.9%
IT	10.6%
Science, engineering	10.3%
Business services	9.0%
HR, training, guidance	8.3%
Research and development	3.8%
Admin or secretarial	3.7%
Health, social services, etc.	1.5%
Skilled operative	0.6%
Land, sea or air transport	0.6%
Leisure, personal service	0.6%
Unskilled operative	0.3%
Education	0.2%
Military, police, prison, fire	0.1%
Other private sector	5.1%
Other public sector	0.1%
Other	10.3%

Sample 2: Management development programme participants

- This sample consisted of 128 Dutch participants on management development programmes at Ashridge Business School, run between 2000 and 2003. Seventy-eight per cent of the group were male and 22% female. Age ranged from 23 to 58 years.

MBTI® Step I instrument

European Data Supplement

Swedish

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Contents

Introduction

Data from five different samples were analysed to produce the findings in this chapter. A brief description of each sample is given below. Further details of the samples are provided in Appendix 1.

- A group of 914 individuals considered to be broadly representative of the Swedish general population. The group comprised 349 research study participants and 565 individuals who responded to a random sampling of the Swedish general population during 2002.
- A sample of 1,817 individuals who completed the MBTI Step I questionnaire in Swedish via the OPPassessment system between 2004 and mid-2008.[1] This sample is considered to be representative of the groups of people with whom the Swedish MBTI instrument has been and will be used for applications such as management development, coaching, counselling and teambuilding. As such, it is likely to represent a cross-section of the Swedish-speaking professional and managerial population.
- A group of 228 Swedish participants on management development programmes at Ashridge Business School, run between 2000 and 2003.
- A group of 50 psychology students at Stockholm University who participated in a test-retest study during 2002.
- A sample of 70 MBTI training course delegates who undertook training during 2002.

The results of the analyses are outlined below.[2]

[1] OPPassessment allows personality questionnaires such as the MBTI instrument to be administered via email and/or completed online.
[2] The collection and analysis of the OPPassessment data was conducted by OPP. All other data collection and analyses were conducted by either Ashridge Business School or Psykologiförlaget. This chapter includes data taken from the *MBTI Step I Swedish Version Manual Supplement* (2003) published by Psykologiförlaget and the Ashridge Management School MBTI research into distribution of type (2003). The content is reproduced with kind permission.

Type distribution

Type tables are a way of illustrating the proportion of each type within a particular group. Below are type tables for three of the samples described on the previous page: the general population sample, the professional and managerial group taken from OPPassessment, and the Ashridge management development programme participants.

For each of the 16 different types, the number of cases, the percentage of the total that this represents and the self-selection ratio (SSR) are shown. The SSR (Myers et al., 1998) is a way of demonstrating whether a given type appears more or less often in a particular group than would be expected given its frequency in a reference group.

The merged data set consisting of the 565 individuals who responded to a random sampling of the Swedish general population and the 349 research study participants who completed the questionnaire is used as the reference group when calculating the SSRs in this chapter. This is the closest match we have at present to a type distribution from a large representative sample of the Swedish population. This combined group will be referred to as the Swedish general population sample hereafter.

An SSR of greater than 1 indicates that a type is over-represented, and an SSR of less than 1 denotes that it is under-represented. Asterisks are used to denote whether the over- or under-representations are statistically significant, based on the results of chi-square analysis.[3]

[3] Chi-square analysis (often abbreviated to χ^2) is a technique used to explore whether observed frequency distributions differ significantly from other, predefined, distributions. In this case, the Swedish general population group is used as the reference group, and the chi-square analysis indicates whether the proportion of people of each type within a particular sample differs significantly from the proportion of people reporting the same type within the reference group.

Swedish general population sample

Table 13.1: Type table for Swedish general population data[4] (reported type, n=914)

ISTJ	ISFJ	INFJ	INTJ
n=104 11.4%	n=61 6.7%	n=22 2.4%	n=10 1.1%
ISTP	**ISFP**	**INFP**	**INTP**
n=50 5.5%	n=28 3.1%	n=37 4.0%	n=29 3.2%
ESTP	**ESFP**	**ENFP**	**ENTP**
n=41 4.5%	n=53 5.8%	n=107 11.7%	n=54 5.9%
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=129 14.1%	n=110 12.0%	n=55 6.0%	n=24 2.6%

Type	n	%
E	573	62.7%
I	341	37.3%
S	576	63.0%
N	338	37.0%
T	441	48.2%
F	473	51.8%
J	515	56.3%
P	399	43.7%

The most common single type preference is ESTJ (14% of the total), closely followed by ESFJ (12%) and ENFP (12%). The least frequently occurring type is INTJ (1%), followed by INFJ (2%), ENTJ, ISFP and INTP (all 3%).

[4] Note that no SSRs are shown in this table because the table contains the reference group itself.

OPPassessment data (representative Swedish-speaking professional and managerial sample)

Table 13.2: Type table for OPPassessment data (reported type, n=1,817)

ISTJ	ISFJ	INFJ	INTJ
n=149 8.2% SSR=0.72**	n=44 2.4% SSR=0.36**	n=15 0.8% SSR=0.34**	n=39 2.1% SSR=1.96
ISTP	**ISFP**	**INFP**	**INTP**
n=69 3.8% SSR=0.69*	n=28 1.5% SSR=0.50**	n=34 1.9% SSR=0.46**	n=44 2.4% SSR=0.76
ESTP	**ESFP**	**ENFP**	**ENTP**
n=133 7.3% SSR=1.63**	n=63 3.5% SSR=0.60**	n=142 7.8% SSR=0.67**	n=189 10.4% SSR=1.76**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=397 21.8% SSR=1.55**	n=182 10.0% SSR=0.83	n=112 6.2% SSR=1.02	n=177 9.7% SSR=3.71**

Type	n	%
E	1,395	76.8%**
I	422	23.2%**
S	1,065	58.6%*
N	752	41.4%*
T	1,197	65.9%**
F	620	34.1%**
J	1,115	61.4%*
P	702	38.6%*

*Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

The most common single type preference is ESTJ (22% of the total); this is a common finding with managerial groups in other countries. The SSR results suggest that, in comparison with the Swedish general population, those with preferences for SF are under-represented. Again, this is a common finding with managerial groups in other countries. This often corresponds with an over representation of people with preferences for NT. However, whilst ENTJ, ENTP and (to some extent) INTJ are over-represented, the proportion of people with a preference for INTP is similar to the Swedish general population group. This may be the result of a general tendency towards Extraversion amongst the managerial group.

Management development programme participants

Table 13.3: Type table for management development course participants (reported type, n=228)

ISTJ	ISFJ	INFJ	INTJ
n=22 9.6% SSR=0.85	n=5 2.2% SSR=0.33**	n=3 1.3% SSR=0.55	n=6 2.6% SSR=2.41
ISTP	**ISFP**	**INFP**	**INTP**
n=9 3.9% SSR=0.72	n=2 0.9% SSR=0.29	n=2 0.9% SSR=0.22*	n=7 3.1% SSR=0.97
ESTP	**ESFP**	**ENFP**	**ENTP**
n=27 11.8% SSR=2.64**	n=4 1.8% SSR=0.30*	n=11 11% SSR=0.41**	n=26 11.4% SSR=1.93**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
n=52 22.8% SSR=1.62**	n=9 3.9% SSR=0.33**	n=7 3.1% SSR=0.51	n=36 15.8% SSR=6.01**

Type	n	%
E	172	75.4%**
I	56	24.6%**
S	130	57.0%
N	98	43.0%
T	185	81.1%**
F	43	18.9%**
J	140	61.4%
P	88	38.6%

*Difference significant at p<0.05, based on chi-square results.
**Difference significant at p<0.01, based on chi-square results.

The type distribution is similar to the OPPassessment sample described above, with ESTJ (23% of the total) being the most common single type preference, and NT (with the exception of INTP) being over-represented and SF being under-represented. The main difference between the two distributions is a higher proportion of people with a preference for Thinking amongst this group. This is likely to be at least partly a gender effect, as this sample contains a higher proportion of males (79%) than does the OPPassessment group (53%).

Reliability

The reliability of a test or questionnaire relates to how consistent and precise it is. Internal consistency reliability addresses the question of whether all the questions in a scale measure the same construct. A common measure of internal consistency reliability is coefficient alpha (Cronbach, 1951). The alpha coefficients for the Swedish general population and OPPassessment samples are shown in Table 13.4.

Table 13.4: Internal consistency reliability

Dimension	Coefficient alpha	
	General population	OPPassessment
E–I	0.86	0.82
S–N	0.80	0.72
T–F	0.78	0.76
J–P	0.84	0.79

It is generally agreed that internal consistency reliability should achieve a value of at least 0.7 for a test to be considered to be reliable.[5] On this basis, all the dimensions of the questionnaire show good internal consistency reliability in the two groups. In addition, the alpha coefficients have been found to be consistent across different age groups and both genders.

Test–retest reliability is another form of reliability, and is concerned with the consistency of results on the same instrument over time. It is calculated by correlating the results from the first time an instrument is taken with those of a subsequent administration after a suitable period of time has elapsed. The strength of these correlations is a measure of how consistent the instrument is over time. The test–retest correlations obtained with a three-month interval between administrations are shown in Table 13.5, based on the Stockholm University sample of 50 psychology students. The table also shows the proportion of people who had the same preference on both testing occasions for each dimension, and the proportion of people for whom four, three and two preferences remained the same on both occasions. None of the participants has fewer than two of their preferences remaining the same. These figures are all very satisfactory.

[5] For example, see Nunnally (1978) or Kline (2000).

Table 13.5: Test–retest reliability

Dimension	Correlation
E–I	0.92
S–N	0.80
T–F	0.81
J–P	0.80

Dimension	Percentage reporting the same preference
E–I	92%
S–N	82%
T–F	90%
J–P	78%

All four preferences remaining the same	52%	90%
Three preferences remaining the same	38%	
Two preferences remaining the same	10%	10%
Fewer than two preferences remaining the same	0%	

Intercorrelations between MBTI dimensions

One of the original aims of developing the MBTI questionnaire was to see if dimensions could be produced that were independent of each other. Results from other language versions have shown that this was achieved with all dimensions except Sensing–Intuition and Judging–Perceiving. This shows up despite the fact that questions were carefully chosen to sort on only one dimension. The author of the questionnaire hypothesised that the S–N/J–P relationship may simply be a reflection of reality rather than a failing in the construction of the questionnaire.

The intercorrelations between dimensions amongst the OPPassessment sample are shown in Table 13.6. In order to be able to calculate the correlations, scores on each dimension were converted to continuous scores.[6]

Table 13.6: Intercorrelations between dimensions

	E–I	S–N	T–F	J–P
E–I		–0.18**	–0.13**	–0.01
S–N			0.15**	0.40**
T–F				0.14**
J–P				

**Significant at p<0.01.

Although statistically significant, only very low correlations were found between most of the dimensions. The S–N/J–P relationship that has been found with other language versions has been replicated, showing that a preference for Sensing is likely to be associated with a preference for Judging, and that a preference for Intuition is likely to be associated with a preference for Perceiving.

[6] Continuous scores (Myers and McCaulley, 1985, p. 9) place an individual's score on each dimension onto a continuous scale with a mid-point of 100. To calculate continuous scores, Preference Clarity Index (PCI) scores for each dimension are either subtracted or added to 100, depending on which direction the overall preference is. PCI scores in the direction of E, S, T or J are subtracted from 100. PCI scores in the direction of I, N, F or P are added to 100.

Validity: the accuracy of the Swedish MBTI Step I instrument in predicting best-fit type

The purpose of the MBTI instrument is to help individuals to establish their validated or 'best-fit' psychological type. A key measure of the validity of the instrument is, therefore, how well the results relate to best-fit (validated) type. These data are useful to practitioners in knowing how typically accurate the reported result is likely to be.

Best-fit data are available for one of the samples. The MBTI qualifying workshop delegates established their best-fit type as part of their training course, and this was collected for the group.

Table 13.6 presents the results of the analysis comparing reported with best-fit type. The Swedish MBTI Step I questionnaire performs in a very similar way to other European language versions, and there is very good evidence for the accuracy of the instrument. In 59% of cases, a respondent's reported type will match their best-fit type, and in 93% of cases at least three of the four preferences will match.

Table 13.7: Match of reported and best-fit type

	MBTI qualifying training course delegates (n=70)	
Agrees with all four letters	59%	93%
Agrees with three letters	34%	
Agrees with two letters	7%	7%
Agrees with one letter	0%	
Agrees with no letters	0%	

	Percentage agreement
Dimension	Training delegates
E–I	94%
S–N	79%
T–F	90%
J–P	88%

Further analysis was carried out to investigate the validity and accuracy of the questionnaire. MBTI qualifying training course delegates were asked how confident they felt about each of their best-fit preferences (on a scale of 1 to 5, where 5 indicated the highest degree of confidence). For every dimension, over two-thirds of the group reported a rating of either 4 or 5, showing that they were confident about their type (E–I 80%, J–P 71%, T–F 70%, S–N 69%). This provides further support for the validity of the MBTI approach.

Construct validity

Construct validity is concerned with whether an instrument successfully measures a particular psychological construct. If it can be demonstrated that an instrument does do this, then the instrument can be said to have construct validity.

Construct validity can be measured in two ways. The first method is to correlate individuals' scores on the instrument with the behaviours they would be expected to show if they possessed the relevant psychological construct. The second method is to correlate scores on the instrument with those on another instrument which is already in existence and for which we already know what the scores measure.

In accordance with the first method, the Swedish general population sample were asked to respond to a number of questions about their views on work and organisational issues, as well as to complete the MBTI Step I questionnaire.

Comfort with different organisational cultures

The respondents were initially asked to record on a five-point scale their degree of comfort with different types of organisations, where 1 represented 'Very uncomfortable' and 5 'Very comfortable'. Prior to analysing the data, MBTI experts made predictions about the relationships between the MBTI dimensions and the responses to the questions. Once the predictions had been made, the data were analysed to explore the relationships between reported MBTI preferences and comfort with different organisational cultures. The questions, predictions and results are shown in Table 13.8. Asterisks in the significance column indicate significant relationships, based on the results of one-way analysis of variance. Where there are no asterisks, this signifies that the data did not support the prediction.

Table 13.8: Comfort expressed by different types with different organisational cultures

Organisational characteristic	Prediction		Sig.
	More comfort	Less comfort	
An organisation with a clear structure where it is always apparent who is responsible for what	S	N	*
	J	P	***
	SJ	Non-SJ	***
An organisation where the independence of the employees is stressed	NP	Non-NP	***
	INTP	Non-INTP	
An organisation which stresses employee loyalty and offers 'lifelong employment'	ISTJ	Non-ISTJ	
	ISFJ	Non-ISFJ	
An organisation where everything is done according to the book	S	N	***
	J	P	***
	SJ	Non-SJ	***
An organisation with thousands of employees, perhaps with activities in several countries	N	S	*
	P	J	
An organisation where every job has been rationalised/simplified as much as possible	ST	Non-ST	
An organisation where the employees have different backgrounds	NF	Non-NF	***
An organisation where an employee can be responsible for many different areas	EN	Non-EN	
An organisation where everyone is expected to 'fit into the established pattern'	SJ	Non-SJ	***
An organisation where there are considerable opportunities for promotion and for a high salary, but where there is a lack of job security	SP	Non-SP	***
	TP	Non-TP	
An organisation with fewer than 30 employees where everybody knows everybody else	IF	Non-IF	
An organisation which regards its employees as individuals with unique skills	NF	Non-NF	***
An organisation where most employees have more or less the same background	IS	Non-IS	***

Significant at: *p<0.05, **p<0.01, ***p<0.001.

Thirteen of the 21 predictions were supported by the data, with the majority being significant at the highest level. It is notable that none of the three whole-type-level predictions were supported by the data. This is perhaps not surprising as it is more difficult to predict the relationship between the complex and dynamic four-letter types and the rather one-dimensional questions about preferred organisational culture.

In order to establish patterns of reported comfort in different organisational cultures at whole-type level, the types are ranked in Table 13.9 according to those who expressed most and least comfort respectively.

Table 13.9: Whole types reporting most and least comfort in different organisational cultures

Organisational characteristic	Most comfort	Least comfort
An organisation with a clear structure where it is always apparent who is responsible for what	1. INTJ 2. ISTJ 3. ISFJ 4. ESTJ	1. INTP 2. INFP 3. ESFP 4. ISFP
An organisation where the independence of the employees is stressed	1. ENTP 2. INFP 3. ENFJ 4. ENTJ	1. ISTP 2. INFJ 3. ESFP 4. INTJ
An organisation which stresses employee loyalty and offers 'lifelong employment'	1. INTJ 2. ISFJ 3. ISTJ 4. ESTJ	1. INFP 2. ENTJ 3. ENFP 4. ENFP
An organisation where everything is done according to the book	1. INTJ 2. ISTJ 3. ESFJ 4. ISTP	1. ISFP 2. INTP 3. INFP 4. INFJ
An organisation with thousands of employees, perhaps with activities in several countries	1. ENTJ 2. INTJ 3. ENTP 4. INTP	1. ISFP 2. ISFJ 3. INFJ 4. ESFP
An organisation where every job has been rationalised/simplified as much as possible	1. ESTP 2. ENTP 3. ISFP 4. ESTJ	1. INFJ 2. ISFJ 3. INFP 4. ENFP
An organisation where the employees have different backgrounds	1. ENTJ 2. ENFJ 3. ENTP 4. INFP	1. ISTP 2. ISFP 3. ISFJ 4. INTJ
An organisation where an employee can be responsible for many different areas	1. ESTJ 2. ENTJ 3. ENFJ 4. ENTPJ	1. ISTP 2. INFJ 3. ISFP 4. ISTJ
An organisation where everyone is expected to 'fit into the established pattern'	1. INTJ 2. ISFJ 3. ISTJ 4. ISTP	1. INTP 2. INFP 3. ENFP 4. INFJ

An organisation where there are considerable opportunities for promotion and for a high salary, but where there is a lack of job security	1. ENTP 2. ENTJ 3. ISTP 4. ESTP	1. ISFP 2. INFJ 3. ISFJ 4. ENFJ
An organisation with fewer than 30 employees where everybody knows everybody else	1. ENFJ 2. ENFP 3. ESTP 4. ISTP	1. INTP 2. INTJ 3. ENTP 4. ESFJ
An organisation which regards its employees as individuals with unique skills	1. INFP 2. INFJ 3. ENFJ 4. ENFP	1. ISTP 2. INTJ 3. ISTJ 4. ISFP
An organisation where most employees have more or less the same background	1. ISFP 2. ISTP 3. ISFJ 4. ISTJ	1. ENTJ 2. INTP 3. ENTP 4. INFP

The table shows that people with a preference for J, and even the combination of TJ, tend to report feeling more comfortable in organisational cultures that are distinguished by structure and clear delineation of responsibility, stressing the loyalty and responsibility of employees, and where everything is done by the book. The opposite is the case for people with a preference for F and, to some extent, FP.

People with preferences for N and EN feel comfortable in large organisations, where the employees have different backgrounds and are responsible for many different areas, and in organisations where the independence of employees is stressed, whereas people with preferences for I and IS feel least comfortable in cultures of that kind. The latter are more comfortable in organisations where most people have more or less the same background.

Those with a preference for IS report that they are most comfortable in organisations where they are expected to ‘fit into the established pattern’, while people preferring NP state that they do not feel at home in this type of organisation.

People with a preference for ET feel comfortable in organisations where each job is simplified as much as possible; those with a preference for F feel the opposite.

Organisations where there are considerable opportunities for advancement and high salaries, but where there is little job security, appeal to those with a preference for TP, while the opposite is the case for those with a preference for FJ.

People with a preference for NF appreciate organisations where each employee is regarded as unique, while those with a preference for T feel least comfortable in such environments.

Comfort with different types of job

The Swedish general population sample were also asked to rate their degree of comfort working in different kinds of jobs, on a five-point scale. Predictions about the relationships between the MBTI dimensions and the responses to the questions were made in the same way as described above. The results are shown in Table 13.10.

Table 13.10: Comfort expressed by different MBTI types with different kinds of jobs

Job characteristic	Prediction		Sig.
	More comfort	Less comfort	
A job which involves you in a number of clear and well-defined projects	J	P	*
	S	N	
	SJ	Non-SJ	
A job with considerable variation, some of it unexpected	P	J	***
	NP	Non-NP	**
	SP	Non-SP	
A job where you are expected to report to the same manager every day	S	N	***
A job where more or less the same things happen every day	S	N	***
A job which makes considerable demands on you in terms of working overtime in order to meet deadlines or to achieve goals	P	J	
A job where you report to a number of different people depending on the task in question	ENP	Non-ENP	

Significant at: *p<0.05, **p<0.01, ***p<0.001.

Five of the ten predictions were supported by the data. In order to establish patterns of reported comfort with different work methods at whole-type level, the types are ranked in Table 13.11 according to those who expressed most and least comfort respectively.

Table 13.11: Whole types reporting most and least comfort with different kinds of jobs

Job characteristic	Most comfort	Least comfort
A job which involves you in a number of clear and well-defined projects	1. INTJ 2. ENTJ 3. ESTJ 4. ENTP	1. ISFJ 2. INTP 3. ESTP 4. ESFP
A job with considerable variation, some of it unexpected	1. ESTP 2. ENFP 3. INFP 4. ENFJ	1. ISFP 2. INFJ 3. ISTJ 4. ISFJ
A job where you are expected to report to the same manager every day	1. INTJ 2. ISTP 3. ISFJ 4. ESFJ	1. ENFP 2. INFP 3. INTP 4. INFJ
A job where more or less the same things happen every day	1. INTJ 2. ISFJ 3. ESFJ 4. ISTJ	1. ENFP 2. ENTP 3. INFJ 4. INTP
A job which makes considerable demands on you in terms of working overtime in order to meet deadlines or to achieve goals	1. ENTJ 2. ESTP 3. ENTP 4. ESFP	1. INFJ 2. INFP 3. ENFJ 4. ISFJ
A job where you report to a number of different people depending on the task in question	1. ENTJ 2. INTJ 3. INFP 4. ENTP	1. INFJ 2. ISTP 3. ISFJ 4. ISFP

The results show that people with preferences for T and J and also for the combination TJ tend to report comfort in work involving stability, continuity and clarity. N and P preferences are to be found among the types reporting least comfort in such work; they state instead that they are most comfortable in jobs with considerable variation, less structure and a less predictable course of events.

People with preferences for E and T report a high degree of comfort in jobs that are more demanding in terms of time pressures or performance.

Types with a preference for I and the combination IJ as well as IFJ feel less comfortable in jobs offering variation and unexpected events or where they have to work with goal-oriented time pressures in order to achieve deadlines. These types are more comfortable when they are

allowed to work on their own, to concentrate on one thing at a time and to have a working situation which is organised and planned in advance.

Correlations with other instruments

Correlations between the MBTI Step I questionnaire and other psychometric instruments is another way of establishing construct validity.

The Hogan Personality Inventory

The Hogan Personality Inventory (HPI) (Hogan and Hogan, 1997, 2002, in Swedish) is a well-known measure of normal personality that is based on the Five-Factor Model of personality, and is designed to predict occupational success. Table 13.12 shows relationships found between the MBTI dimensions and the seven HPI scales. The table shows the relationships predicted by MBTI experts, and also which of these predictions were either supported or not supported by the data.

Table 13.12: Relationship between MBTI dimensions and HPI scales (n=212)

HPI scale	Description	Prediction	Sig.
Adjustment	Measures the degree to which a person appears calm and self-accepting or, conversely, self-critical or tense	E	
Ambition	Measures the degree to which a person seems socially self-confident, leader-like, competitive and energetic	E	***
		T	*
		EJ	*
		ENTJ	**
		ESTJ	*
Sociability	Measures the degree to which a person seems to need and/or enjoy interacting with others	E	***
		N	**
		EF	**
		EN	***
		ENP	***
Agreeability	Measures the degree to which a person is seen as perceptive, tactful and socially sensitive	F	***
		E	***
		EF	***
		NF	
		SF	**
		ENFP	*
Prudence	Measures the degree to which a person seems conscientious, conforming and dependable	S	
		J	**
		SJ	**
Intellectance	Measures the degree to which a person is perceived as bright, creative and interested in intellectual matters	N	
		T	*
		NT	**
Scholarship	Measures the degree to which a person seems to enjoy academic activities and to value educational achievement for its own sake	N	

Correlation significant at: *p<0.05, **p<0.01, ***p<0.001.

Of a total of 24 predictions, only five were not supported by the data. This shows that the relationships between MBTI dimensions and HPI scales are similar to what would be expected, hence providing evidence of construct validity.

The Motivation, Values and Preferences Inventory

The Motives, Values and Preferences Inventory (MVPI) (Hogan and Hogan, 1996, Swedish trial version, Psykologiförlaget, 2003) provides a measure of an individual's core values, goals and interests. It consists of ten scales, which are core values, goals and activities that form part of an individual's identity. Table 13.13 shows relationships found between the MBTI dimensions and the ten MVPI scales. The

table shows the relationships predicted by MBTI experts, and also which of these predictions were either supported or not supported by the data.

Table 13.13: Relationship between MBTI dimensions and MVPI scales (n=86)

MVPI scale	Description	Prediction	Sig.
Aesthetics	Need for self-expression: wanting to infuse quality into the look, feel and design of work products	N	***
Affiliation	Wanting frequent and varied social contact	F	*
		EF	*
Altruistic	Wanting to help, serve and encourage others	EF	
Commerce	Interest in money, profits, investment and business opportunities	T	*
Hedonism	Wanting fun, variety, excitement and pleasure	S	*
Power	Wanting to be in control, to succeed and to create a legacy	T	*
		ET	*
		NT	*
Recognition	Wanting to be known, recognized, appreciated and famous	No prediction	
Science	Enjoying research, interested in technology and preferring data-based decisions	N	
Security	Need for predictability, structure and order	S	*
		SJ	*
Tradition	Believing in personal customs, duty, hard work and respect for authority	J	*

Correlation significant at: *p<0.05, **p<0.01, ***p<0.001.

Of a total of 13 predictions, only two were not supported by the data. Although based on a rather small sample size, these data provide further evidence of construct validity.

The Innovation Potential Indicator

The Innovation Potential Indicator (IPI) (Patterson, 1999, Swedish trial version, Psykologiförlaget, 2002) looks at behaviours that enhance or impede the development and generation of new ideas, processes and products within organisations. The results of this questionnaire can be used to understand how innovative an individual has the potential to be. The IPI consists of four scales. Table 13.14 shows relationships

found between the MBTI dimensions and the four IPI scales. The table shows the relationships predicted by MBTI experts, and also which of these predictions were either supported or not supported by the data.

Table 13.14: Relationship between MBTI dimensions and IPI scales (n=212)

MVPI scale	Description	Prediction	Sig.
Motivation to Change	The motivation component. Here, a person's drive to seek and adopt change is measured.	P	
		E	***
		EN	
Challenging Behaviour	The social component. This element assesses how an individual interacts, and the likelihood that they will challenge the thinking of others in order to solve problems at work.	T	**
		E	*
		ET	**
Adaption	The problem-solving component. This evaluates whether an individual typically prefers tried-and-tested methods when tackling issues and solving problems.	SJ	*
Consistency of Work Styles	The action component. This measures a person's inclination to work methodically and systematically in accordance with the norms of the organisation.	J	***

Correlation significant at: *p<0.05, **p<0.01, ***p<0.001.

Again, the patterns within the data are as would be expected, showing clear links in the expected direction in most instances.

In summary, there is good evidence for the validity of the Swedish MBTI Step I instrument. Specifically:

- There is a high level of agreement between best-fit and reported type, as high as for the English language version.
- Respondents are confident about their results.
- Respondents of different types have preferences for different kinds of organisational cultures and jobs that are consistent with what we would expect from type theory.
- Scores on the MBTI Step I dimensions show clear relationships in the expected direction with scores on other instruments that measure related psychological constructs.

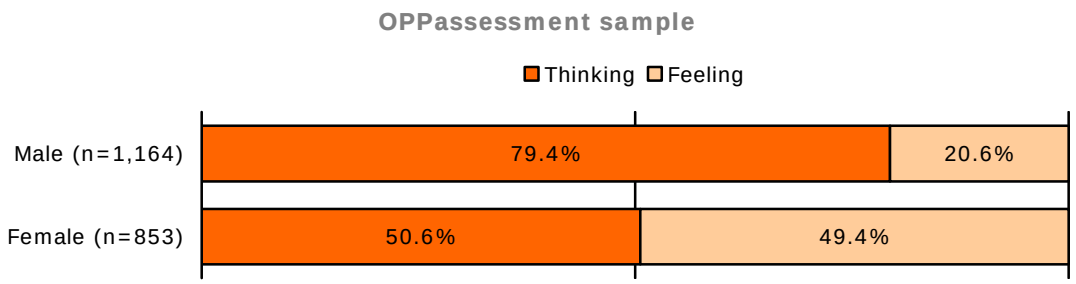
Group differences in type

The large OPPassessment sample was used to explore group differences in type. The relationship of type to each of the demographic factors for which information was gathered is described below.

Gender

Across countries, most groups who complete the MBTI questionnaire show a significant gender difference on the Thinking–Feeling dimension, and this is the case for the group in this study, as shown in Figure 13.1.[7]

Figure 13.1: Gender differences on the T–F dimension



When compared with the T–F distribution in the combined sample, Thinking preferences are over-represented amongst men and Feeling preferences are over-represented amongst women. This effect has been found many times with many different language versions of the instrument in a number of different cultures.

Age

Previous research using UK Step I continuous scores has shown significant correlations between age and three of the four dimensions (Warr, Miles and Platts, 2001). Older people were more likely than younger people to have preferences for Introversion, Sensing and Judging.

The data in this supplement were analysed in a slightly different way, by looking for differences in average age between people with preferences for Extraversion versus those with preferences for Introversion, for Sensing versus Intuition, for Thinking versus Feeling and for Judging versus Perceiving. The OPPassessment sample showed a statistically significant relationship between age and only one of the dimensions,[8] as shown in Table 13.15. The mean age of people with a

[7] $\chi^2=165.97$; significant at $p<0.001$.
[8] Independent-samples t-tests; significant at $p<0.001$.

preference for Feeling was approximately one and a half years higher than of those with a preference for Thinking.

Table 13.15: Significant mean age differences

	Thinking	Feeling	Difference	Significance
Mean age (years)	40.60	42.27	1.67	***

Difference significant at: *p<0.05, **p<0.01, ***p<0.001.

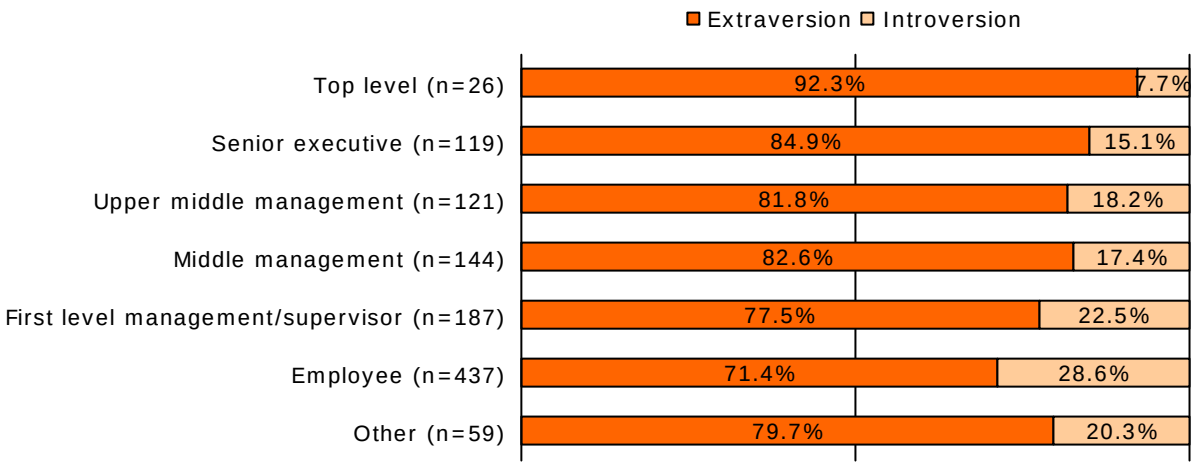
Occupational level

Previous research in other countries has demonstrated that individuals in higher-level jobs in organisations are more likely to have preferences for Intuition and for Thinking than those in lower-level jobs (Quenk, Hammer and Majors, 2004).

This is reflected in the relationship of the Sensing–Intuition and Thinking–Feeling dimensions with occupational level in the OPPassessment sample. A relationship was also found with the Extraversion–Introversion dimension.

The data suggest that individuals at the top level are most likely to have a preference for Extraversion, and that the proportion of people with Extraversion preferences decreases steadily with occupational level down to employees (with the exception of upper middle management and middle management, which are similar), as shown in Figure 13.2.

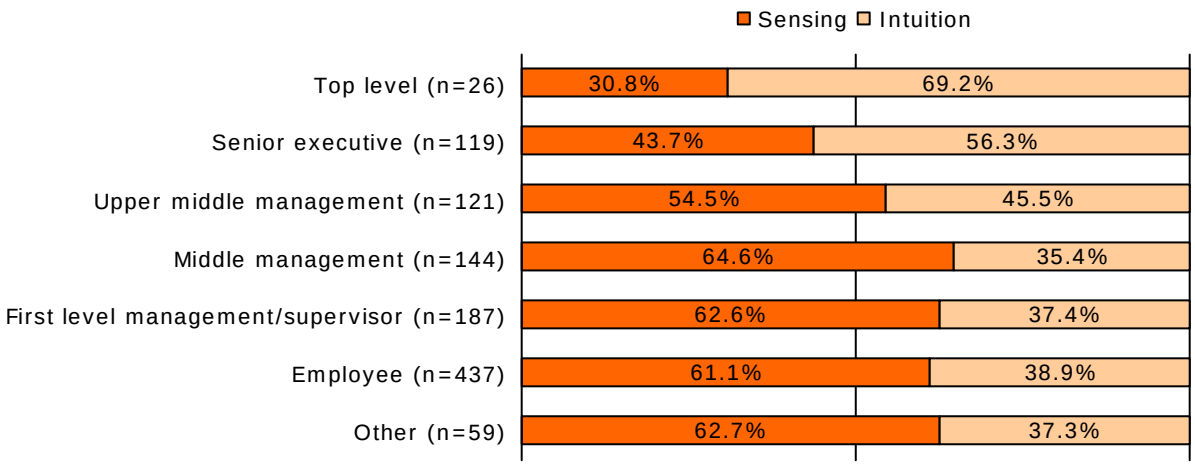
Figure 13.2: Extraversion–Introversion[9] and occupational level (OPPassessment data)



The data also suggest that individuals at the top level are most likely to have a preference for Intuition, followed by senior executives and those in upper middle management. The proportions of people with preferences for Intuition were lowest amongst those from middle management down to employee level, as shown in Figure 13.3.

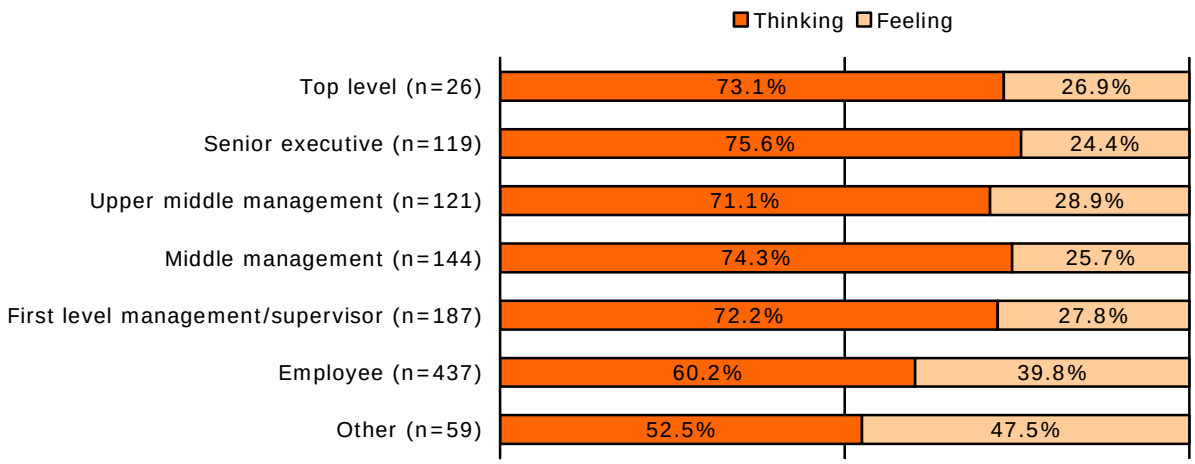
[9] $\chi^2=19.95$; significant at $p<0.01$.

Figure 13.3: Sensing–Intuition[10] and occupational level (OPPassessment data)



It was also found that those with a preference for Thinking are slightly under-represented at employee level, as shown in Figure 13.4. All other occupational levels contained a similar (higher) proportion of Thinking types.

Figure 13.4: Thinking–Feeling[11] and occupational level (OPPassessment data)



[10] $\chi^2=24.88$; significant at $p<0.001$.
[11] $\chi^2=25.82$; significant at $p<0.001$.

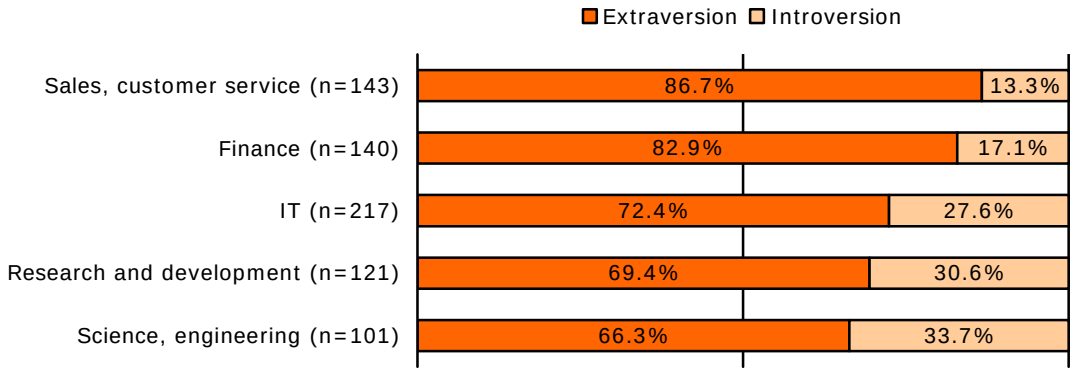
Education

Specific educational qualifications were not collected for the OPPassessment sample; however, the age at which individuals left full-time education was. Those who left full-time education at a higher age were significantly more likely to have a preference for Intuition.[12] However, although statistically significant, the difference was only one year in real terms.

Work area

Previous research into MBTI type suggests that an individual's type influences their choice of career (Hammer, 1998), and indeed the data in this chapter show that there is a statistically significant relationship between three of the dimensions and work area. The Judging–Perceiving dimension was not shown to exhibit a significant relationship with job type. In the figures that follow, categories have been re-ordered according to the percentage of E, S or T, and work areas with fewer than 100 respondents have been omitted (as well as undefined work areas such as 'Other').

Figure 13.5: Extraversion-Introversion[13] and work area



[12] Independent-samples t-test; t=–2.600, significant at p<0.01.
[13] χ^2=35.88; significant at p<0.01.

Figure 13.6: Sensing–Intuition[14] and work area

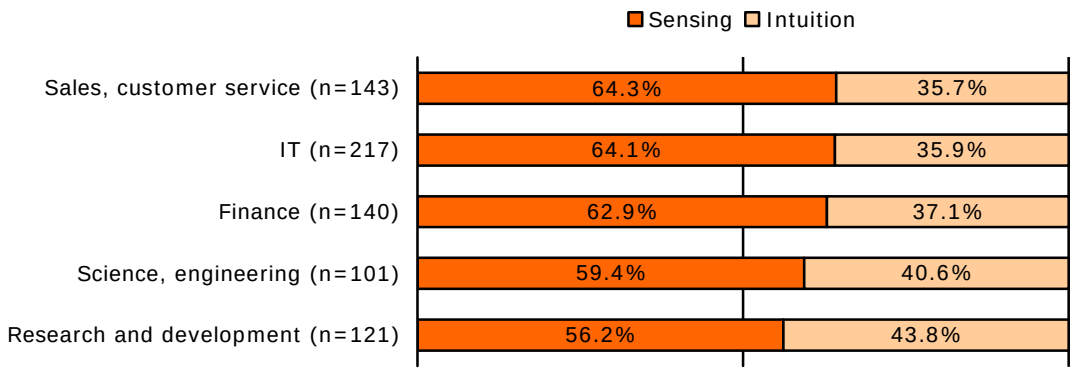
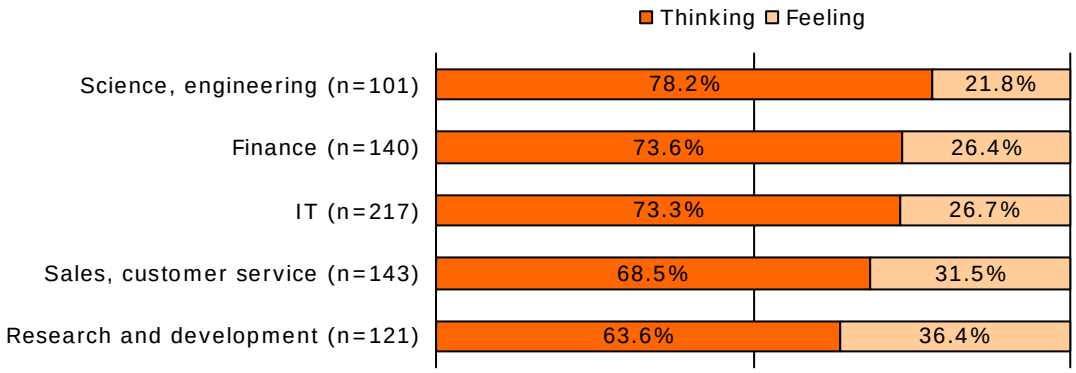


Figure 13.7: Thinking–Feeling[15] and work area



Nationality

Information on nationality was available for the OPPassessment group. Ninety-three per cent of the group were Swedish; other nationalities included Finnish, Danish and Norwegian. However, no other nationality was represented in sufficiently large numbers for an analysis of type differences by nationality to be conducted.

Employment status

Employment status information was available for the OPPassessment sample. However, the only two categories containing a sufficiently large number of people for the results to be compared were 'full-time' and 'part-time'. The analyses showed differences across the two groups on two dimensions, Thinking–Feeling[16] and Judging–

[14] $\chi^2=30.65$; significant at $p<0.01$.
[15] $\chi^2=55.55$; significant at $p<0.001$.
[16] $\chi^2=18.64$; significant at $p<0.001$.

Perceiving.[17] Those who worked full-time were more likely to have preferences for Thinking and Perceiving than those who worked part-time. The Thinking–Feeling pattern is likely to be a gender effect; 93% of part-time workers were female, compared with 46% of the total group and 42% of full-time workers.

[17] $\chi^2=5.63$; significant at $p<0.05$.

Appendix 1: Sample descriptions

Sample 1: Swedish general population sample

This sample consists of 349 research study participants who completed the MBTI Step I questionnaire in spring 2002, and 565 individuals who responded to a random sampling of the Swedish general population in autumn 2002. Fifty-four per cent of the respondents were male and 46% were female. The mean age of the group was 43 years.

A range of education levels were represented:

Education level	Percentage
Higher degree	1%
>3 years university study	28%
<3 years university study	14%
Compulsory school + 3–4 years high school	21%
Compulsory school + 2 years high school	16%
Compulsory school	17%
Not disclosed	3%

The majority of the people were in salaried employment:

Occupation	Percentage
Salaried employment	61%
Studies/retraining	9%
Self-employed	8%
Temporary staff	7%
Early retirement	4%
Senior citizen	4%
Long-term sickness	3%
Unemployed	3%
Maternity/paternity leave	1%

The full range of organisational levels was represented, with 'workers' forming the largest group:

Organisational level	Percentage
Senior manager	5%
Middle manager	9%
Supervisor/project leader	10%
Senior administrator/specialist (non-managerial)	15%
Lower level administrator	16%
Worker	38%
Self-employed	3%
Not disclosed	4%

Sample 2: Data from OPPassessment (representative Swedish-speaking professional and managerial sample)

This sample consists of 1,817 individuals who completed the MBTI Step I questionnaire in Swedish via the OPPassessment system between January 2004 and June 2008. Fifty-three per cent of the respondents were male and 47% were female. Age ranged from 20 to 69 years, with a mean of 41 and median of 40.

Nationality was disclosed by 73% of respondents. Of these, 93% were Swedish. No other individual nationality was represented in large numbers.

Nationality	Percentage
Swedish	93.1%
Other	3.5%

The majority of the group were in full-time employment:

Employment status	Percentage
Full-time	90.9%
Part-time	6.2%
Self-employed	2.0%
Unemployed	0.4%
Retired	0.4%
Homemaker	0.0%

The majority of the group were of managerial level or above, although the largest single group was employee level (40.0%):

Occupational level	Percentage
Top level	2.4%
Senior executive	10.9%
Upper middle management	11.1%
Middle management	13.2%
First level management/supervisor	17.1%
Employee	40.0%
Other	5.4%

A range of work areas were represented:

Work area (job type)	Percentage
IT	19.7%
Sales, customer service	13.0%
Finance	12.7%
Research and development	11.0%
Science, engineering	9.1%
Admin or secretarial	4.3%
HR, training, guidance	4.2%
Education	3.6%
Business services	1.3%
Health, social services etc.	1.3%
Land, sea or air transport	0.6%
Skilled operative	0.3%
Unskilled operative	0.3%
Other private sector	11.1%
Other public sector	0.9%
Other	6.8%

Sample 3: Management development programme participants

This sample consists of 228 Swedish participants on management development programmes at Ashridge Business School, run between 2000 and 2003. Seventy-nine per cent of the group were male and 21% female. Age ranged from 26 to 63 years.

Sample 4: Swedish psychology students – best-fit study

This sample consists of 50 psychology students at Stockholm University who participated in a test–retest study during 2002. Sixty-two per cent were female and 38% were male. The mean age of the group was 33 years. No other demographic data were collected for this group.

Sample 5: Delegates on Swedish MBTI qualifying training courses

The sample consisted of 70 MBTI training course delegates who undertook training with Assessio during 2002. Seventy-seven per cent of the respondents were female and 23% were male. The mean age of the group was 43 years.

The majority of the group were educated to degree level:

Education level	Percentage
Higher degree	4%
>3 years university study	73%
<3 years university study	16%
Compulsory school + 3–4 years high school	3%
Compulsory school + 2 years high school	3%
Compulsory school	1%

Everyone was either in salaried employment or self-employed:

Occupation	Percentage
Salaried employment	90%
Self-employed	10%

A broad range of organisational levels was represented, with 'Senior administrator/specialist (non-managerial)' forming the largest group:

Organisational level	Percentage
Senior manager	9%
Middle manager	4%
Supervisor/project leader	10%
Senior administrator/specialist (non-managerial)	43%
Lower level administrator	19%
Other activity	1%
Not disclosed	14%

MBTI® Step I instrument

European Data Supplement

Bibliography

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