Mental Muscle Diagram Indicator (MMDI)
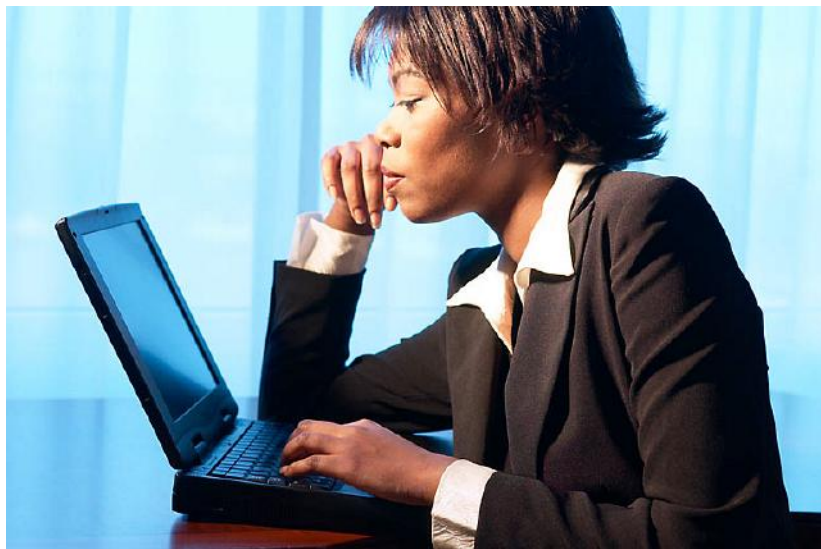

Technical Manual

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Version: 08 July 2015

CONTENTS

1. INTRODUCTION

Overview

This document provides technical information about the *Mental Muscle Diagram Indicator*™ (*MMDI*™) and associated reports, which can be used to increase self-awareness, develop leadership potential, improve relationships, and assist in career choice. This manual focuses primarily on the latter – its use by individuals in finding a suitable career.

Section 2 discusses long-standing criticisms of the use of psychological type to support career choice. It describes how these criticisms are addressed in the MMDI, the design of which is a little different to most other apparently-similar questionnaires. Section 3 provides information on the history of development of the MMDI. The remaining sections provide more technical information - its theoretical basis, differences with Myers Briggs theory, and validity/reliability data.

Corporate System

Individuals can complete the questionnaire at http://www.teamtechnology.co.uk/mmdi/questionnaire/ for free. It provides a free online report and video introducing their personality type results. There are optional, low-cost reports going deeper into the personality results, leadership profile, and career options. There is also a "Career Analysis Tool" that predicts enjoyment in various careers, enables the individual to shortlist those that are most promising, and provides links to additional information.

The MMDI questionnaire and reports are designed for an individual's own use in self-analysis. However, there is a counsellor or consultant's administration system that enables bulk purchase at https://www.metarasa.biz. At this site, large numbers of questionnaires and optional reports can be purchased and administered quickly, easily and at lower cost. When individuals complete the questionnaire, they receive their own reports online immediately (and without them having to make individual purchases). The reports are also available to the administrator via his/her control panel.

Use of this bulk purchase system does not require any qualification training or certification. It is provided as a bulk purchase system, in which individuals complete the questionnaire and gain access to their own reports. If the administrator plans to discuss the results with the individual, it is the responsibility of the administrator to investigate and ensure (a) that they have the appropriate knowledge/expertise to do so, (b) limit its use to that described in this manual and the reports, and (c) ensure that the use to which they put the system is suitable for both the particular application and the laws of the country in which they are using it.

2. USING PSYCHOLOGICAL TYPE IN CAREER CHOICE

Psychological type theory was developed by C.G. Jung during and after the period of the first world war. It was then adapted and made popular in the form of a questionnaire by the mother-daughter pair of Katharine Briggs and Isabel Briggs Myers. That questionnaire – the Myers Briggs Type Indicator – has become one of the most widely-used psychometrics in the world, spawning a range of similar competitive questionnaires and thousands of books.

Criticisms of using Type

There have been long-standing criticisms of the use of psychological type in career choice. Those criticisms have usually been directed at the MBTI® questionnaire, though most of them are generic in nature. That is, to greater or lesser extents, they apply to all psychological type instruments that produce a four-letter type code. Although the criticisms have been made several times over the last 20 years, the classic (often referred to) paper on the subject is that of Pettinger (1993). His main criticisms are:

1. Each individual's personality is allocated to one of only 16 personality types which "may simply be an example of stereotypes" (Ibid). This "attempts to force the complexities of human personality into an artificial and limiting classification scheme" (Ibid).

2. The statistical evidence does not support the idea that everyone is one of those personality types. In particular, the scores on each preference do not yield the predicted bimodal distribution.

3. There is no validation evidence to show that someone does better when in a career chosen using personality type.

4. The test-retest reliability of the questionnaire does not match the claim that personality type is inborn and fixed throughout life.

5. The strict cut-off points for each type mean that (for a well-balanced person) a small change in questionnaire responses can result in a big change in their type results and therefore career recommendations.

Contemporary psychometricians are not the only ones to have been making criticisms of the MBTI for a prolonged period of time. For example, in 1985 the Jungian Analyst Andrew Samuels wrote that the basic structure of the MBTI questionnaire, which forces the respondent to choose between opposites, is "contrary to the basic Jungian idea that opposites can be transcended" (Samuels 1985, p. 85).

How the MMDI addresses these criticisms

Most of the problems cited by Pettinger stem from the version of personality type theory that was developed by Katherine Briggs and Isabel Briggs Myers, and used to construct the MBTI instrument. They developed it in the middle of the 20th century, based on the earlier work of C.G. Jung (Jung 1921). When writing about the MBTI, Isabel Briggs Myers presented her version of the theory as being very similar to Jung's apart from some minor modifications (Myers 1980, p. 17).

However, C.G. Jung articulated a very different view of the theory, and these differences are not widely understood. He also directed strong criticism at the adaption of the theory that would later be used to design the MBTI. Some of Jung's criticisms were similar to Pettinger's:

1. He objected to the theory being used to classify people. For example, in the mid 1930s, he added a foreword to *Psychological Types* that said:

    This kind of classification is nothing but a childish parlour game… My typology is… not in any sense to stick labels on people at first sight,… since this serves no other purpose than a totally useless desire to stick on labels. (Jung 1934, p. xiv)

2. Although Jung did not conduct any statistical analysis of types, his version of the theory leads to the prediction of a normal distribution. For example, in a discussion of extraverts and introverts he says:

    There is, finally, a third group… This group is the most numerous and includes the… normal man… The normal man is, by definition, influenced as much from within as from without. He constitutes the extensive middle group. (Jung 1921, pp. 515-6)

3. Jung did not make any comment about the relationship between type and performance in a career. However, we have researched the relationship between preferences and job enjoyment (discussed later under 'validation').

4. Jung did not view type as inborn and immutable. Although he saw one aspect of type as possibly having a biological basis (the degree of extraversion and introversion that is preferred) he saw the others as emerging from a range of complex factors and as being changeable, e.g.:

    The function type is subject to all manner of changes in the course of life (Jung 1937).

5. Jung did not use strict cut-off points to delineate types. Rather, he regarded the types as stereotypes (or "Galtonesque family portraits" - Jung 1921, p. 405) that could be used as "points for orientation" (Jung 1957, p. 304). For Jung, every individual was unique (Jung 1921, p. 516) and the types were akin to landmarks on a map that can help people identify their unique location. He reinforced the orienteering analogy by comparing the preferences to the points of a compass (Jung 1933, p. 96).

In view of these similarities between Pettinger's and Jung's criticisms of the modern use of type theory, and for other reasons which are discussed under the history of development, the MMDI is based primarily on Jung's version of psychological type theory and its interpretation, rather than that of Isabel Briggs Myers. The main implication of this is that the focus of MMDI results is not categorisation but balance. Rather than asking the individual to put themselves in a box (i.e. which type are you?) it identifies their preferred balance – i.e. where on the scale are you, or in what proportion do you like to use all the behavioural styles?

Remaining limitations

The use of Jung's theory and his interpretation of type that is described in this manual addresses most of Pettinger's criticisms. However, even after these are removed, there are still some limitations that need to be borne in mind when using the results of the questionnaire in making important decisions about an individual's future. These include:

- The 'job profiles' used as the basis for predicting job enjoyment are averages only. Every job is different, just as every individual is different. Also, there are many other factors that can make a job more or less enjoyable, such as the relationship with one's manager, relation to other team members, prospects, skills, values, reward/recognition, ambitions, etc. Personality preferences are only one factor in the equation, albeit an important one.

- The personalities of some people change significantly during their working lives, and others remain relatively fixed. Whilst the MMDI can provide a snapshot of current preferences, consideration needs to be given to potential long term changes which the MMDI cannot predict. For example, for those who want to take account of their future development, they may need to ensure that the chosen career does not trap them into a single method of working, but gives them opportunity to change at some point in the future as their personality changes.

- The MMDI reports are concerned with *enjoyment* only and do not predict performance, which is a separate dimension that can sometimes be assessed using aptitude tests. It is possible to be good at a job but not enjoy it, and it is possible to enjoy a job but not perform well at it.

Suggested use of the MMDI reports in career choice

The MMDI reports are best used in the early stages of career research.

- The information about personality can help people develop an initial understanding of themselves, and the balance (of different styles of working) that would be most enjoyable.

- The reports and Career Analysis Tool can help to undertake a high-level survey of mainstream careers and narrow down possible options. The Leadership Report can also provide an indication of the industries that value the type of leadership that is associated with the individual's preferred styles.

- Once a shortlist has been produced, individuals can then investigate each job further by looking at specific information about each career, outside of the MMDI reports. A starting point might be the links provided within the Career Analysis Tool.

3. HISTORY OF DEVELOPMENT

The development of the MMDI™ began in 1996 for two reasons, though during the course of development a third reason emerged that was equally important.

The first reason was to develop an alternative team role model and questionnaire to the Belbin Self Perception Inventory – one that was compatible with and could be used alongside the MBTI instrument. The aim was to help the individual understand the difference between their inner preferences and the way they behaved at work. That team role questionnaire was completed in 2000 – the *Managing Team Roles-indicator*™ and now forms part of the *Type Mapping System*™, published by Team Focus Ltd.

The second reason was to provide a validated and reliable alternative to the many unvalidated personality type questionnaires that were beginning to appear on the internet at that time. The MMDI was one of the first questionnaires to be developed with the primary involvement of internet participants.

The third reason emerged during development. Initially, the design of the questionnaire was based on Isabel Briggs Myers' version of personality type theory. However, when the early versions of the MMDI were subjected to rigorous statistical analysis, some differences with Jung's predictions about type and other statistical problems emerged that could not be overcome. This led to a detailed examination of the differences between IBM's and C.G. Jung's versions of the theories. When the questionnaire was modified to reflect Jung's view rather than Isabel Briggs Myers', the problems were solved. The development of the MMDI therefore took on a third imperative – to reflect C.G. Jung's original theory, which the statistics and validation suggested was more robust and relevant.

The process of development

During development, it was possible to get large amounts of data in a short space of time, because the questionnaire was online. This enabled an approach to development which, using conventional approaches, might have taken decades to complete. In the event, development took 4 years (1996 to 2000), and involved over a quarter of a million people.

The MMDI was developed using an iterative/cyclical process, aimed at simultaneously developing both a closer understanding of Jung's theory and a better questionnaire. The overall aim was to produce an instrument that reflected Jung's predictions about the eight function-attitudes – i.e. the statistics should show inverse correlations between opposites, and each function-attitude should be a separate factor. The cyclical process involved:

1. Formulating a (revised) operational description of the theory of psychological types.

2. Converting that description into new or improved statements in the questionnaire.

3. Putting those statements into a research version of the questionnaire on the internet.

4. Gathering data responses.

5. Analysing the data, using various statistical techniques, to assess how well the questions perform and how closely they reflect Jung's theory of opposites.

6. Identifying areas for improvement, and returning to step 1 or step 2 to incorporate those improvements in the next version of the theory and/or questionnaire.

During the four years of development, there were approximately 90 iterations of this process – i.e. 90 development versions of the questionnaire.

In the final stage of development, a number of formal steps were followed for validation, reliability, and confirmatory factor analysis. These statistics have also been updated in recent years to reflect further developments in research and additional data that was gathered.

4. THEORETICAL BASIS

This section and the next (on technical differences with Myers Briggs theory) describe the understanding of Jung's theory of psychological types that emerged at the end of the process of development, and was operationalised in the MMDI.

Mental functions

In Jung's theory, everyone is unique but makes use of the same basic psychological functions in daily life. The phrase "mental muscles" is intended to convey an analogy with physical muscles – i.e. every person has a unique body, but (apart from rare exceptions) everyone has four limbs. In a similar way, there are four mental functions that are common to everyone:

- Sensation - paying attention to facts or what is actual (reality).

- Intuition – paying attention to possibilities or what might be (potential).

- Thinking – making connections (between realities and/or potential).

- Feeling – giving worth or value (to realities and/or potential).

Each of those functions can be oriented in one of two directions:

- An extraverted orientation directs the function towards the outer world of people and things.

- An introverted orientation directs the function towards the inner world of ideas and information.

The combination of function and orientation (also called 'attitude') gives rise to eight function-attitudes, that everyone uses:

Extraverted Feeling

Giving worth or value to people and things.

When people use extraverted Feeling, they tend to create harmony in the world around them, by building rapport with people, creating a positive team atmosphere, looking after people's welfare, motivating people and/or providing a service to the satisfaction of others. They value people's contributions, seek to develop the role that others play, and invest a lot of effort in building positive relationships. They try to overcome differences of opinion and find ways in which the team can agree.

Introverted Feeling

Giving worth or value to ideas and information.

When people use introverted Feeling, they tend to give importance to particular thoughts, ideas, or beliefs. They are value driven, and in a team discussion they often bring a sense of priority that is derived from their strong convictions. They seize upon and emphasise ideas or thoughts that have the greatest import, bringing them to the fore and stressing their significance. They assess the inherent value or importance of new ideas, focusing on those about which they feel most strongly.

Extraverted Thinking

Making connections between people and things.

When people use extraverted Thinking, they tend to introduce organisation and a logical structure into the way things are done. They organise and systematise the world around them, establishing appropriate plans, identifying and implementing the correct procedures, and then endeavouring to make sure they are followed.

They try to ensure that roles and responsibilities are properly defined and that appropriate resources or skills are available to undertake the work assigned.

Introverted Thinking

Making connections between ideas and information

When people use introverted Thinking, they tend to provide explanation of how and why things happen. They bring structure and organisation into the inner world of ideas and understanding. They analyse things, formulating hypotheses and explanations of how they function, and gather evidence to assess how true those explanations are. They produce mental models that replicate how particular aspects of the world works, and they try to understand the full complexity of any situation.

Extraverted Intuition

Paying attention to possibilities in people and things.

When people use extraverted Intuition, they tend to promote exploration of new and better ways of doing things, to uncover hidden potential in people, things or situations. They break new ground, and are often looking one step beyond the current situation to pursue unexplored avenues, until all the possibilities have been exhausted. Explorers often challenge the status quo and experiment with the introduction of change, to see if the situation can be improved or new potential uncovered.

Introverted Intuition

Paying attention to possibilities in ideas and information.

When people use introverted Intuition, they tend to use their imagination to create new and different ideas and perspectives. They observe their own thought carefully, or the world around them, then use their imaginations to consider what they have observed from a number of different perspectives, and dream up new ideas and insights. Innovators often produce radical solutions to problems, develop long-term vision and demonstrate an apparent understanding of what cannot be clearly known.

Extraverted Sensation

Paying attention to what is actual in people and things.

When people use extraverted Sensation, they tend to bring things to fruition by getting things done, and getting them done now! They are very action-oriented, dealing with whatever tasks the current situation presents, and spurring others into action as well. They make use of their experience and utilise tools or processes of which they already have knowledge. They try to have an immediate impact on things, injecting a sense of urgency, and aiming to achieve clear goals and tangible results.

Introverted Sensation

Paying attention to what is actual in ideas and information.

When people use introverted Sensation, they tend to bring clarity to the inner world of information, ideas and understanding. They listen, ask questions and absorb information, so that in their mind's eye they can achieve as clear a picture or understanding as is possible. They expand their knowledge and collection of experiences, and also look to the future by envisaging clear goals and clear pathways to achievement of those goals. The focus on clarity also brings greater attention to detail.

Functions vs stereotypes

These eight function-attitudes are psychological functions that are present in every individual. They can be converted into stereotypes by changing the wording of the descriptions from "When people use introverted Sensation…" to "An introverted Sensation type will…".

When Jung used the description of a 'type', he intended for it to be treated as a stereotype (Op. Cit.). He did not intend for people to identify with one type as being descriptive of their personality, e.g.:

> The theory of types, [Jung] stated, was a theoretical function "without muscle or flesh, and if you identify with it you identify with a corpse" (Shamdasani, 2003 - quoting notes made and published by Barbara Hannah and others at Jung's 1935 lectures at the ETH, i.e. Swiss Federal Institute for Technology)

Therefore, if one refers to a person's type, this does not mean to imply they only use one function. Rather, these are stereotypes for illustration, i.e. "points for reference" (Jung 1957, p. 304) which enable people to recognise when they use each of the function-attitudes. As the stereotypes are akin to landmarks on a map, this means an individual's personality can be close to one type or, more often, between two or more types. He therefore did not use type to classify people, but he did see the value in using stereotypes to help people recognise aspects of themselves - e.g. identify when their personality was particularly one-sided (or close to being a stereotype):

> In general I use these technical terms in my practical work only when I have to explain to certain patients the one-sidedness of their behaviour. (Jung 1935, p. 186)

In practice, many people in the first half of life are one-sided to some degree. During midlife, they often (though not always) become more balanced and more able to use all of the function-attitudes in a flexible manner.

Alignment of Outer and Inner Adaptation

A concept that is central to all of Jung's theories (not just psychological type) is that of adaptation to both the outer and inner worlds.

> [The] main purpose [of analytical psychology] is the better adaptation of human behaviour, and adaptation in two directions (illness is faulty adaptation)… to external life – profession, family, society – and secondly to the vital demands of his own nature… to bring it to the right pitch of development. (Jung 1926/1946, p. 92)

In most circumstances, Jung's concept of adaptation involves a degree of balance amongst all the functions. If it were possible to adapt perfectly, an individual could use any and all the functions as and when needed:

> Since [every person], as a relatively stable being, possesses all the basic psychological functions, it would be a psychological necessity with a view to perfect adaptation that he should also employ them in equal measure. For there must be a reason why there are different modes of adaptation: evidently one alone is not enough. (Jung 1921, p. 19)

Therefore, in behavioural terms, perfect job performance (external adaptation) involves being able to use whichever psychological functions are the most appropriate for each circumstance, and to the right degree. In practice, however, this degree of flexibility is not available to many people, as they develop a capacity to use some functions more than others:

> A one-sided ("typical") attitude leaves a deficiency in the adaptive performance which accumulates during the course of life. (Ibid)

This has significant implications for both performance and enjoyment in a career. A high level of performance in a job requires (amongst many other things) use of the most appropriate psychological functions for the task

in hand. For example, a member of the operations team in a nuclear power station needs to pay attention to external facts (i.e. use extraverted Sensing) much more than trying out new ideas and breaking new ground (i.e. using extraverted Intuition). However, for someone working in a marketing or advertising agency, the emphasis might be the other way around – needing to constantly innovate.

Someone who has perfect adaption would be able to cope with both jobs. However, given that the adaptation of many people is inclined in a particular direction, this suggests that career enjoyment involves using those function-attitudes that are most in tune with the individual's own personality. Otherwise, for example, someone who wants to spend most time innovating might find it frustrating to work in a nuclear power station where the rules have to be followed very closely. Or a person who likes to deal more with reality and facts might find it stressful to work in a marketing or advertising agency where the content of discussions may often seem ambiguous or ill-defined.

MMDI validation research, detailed later in this manual, confirmed that, when there is a disparity between the individual's own preferences and the demands of the career, the average level of job enjoyment falls. That is, a good career choice might involve one in which the external adaptation that is required (for performance) is aligned with the internal adaptation to the individual's own preferences (for enjoyment). This principle forms part of the MMDI algorithm that predicts job enjoyment.

Prediction of job enjoyment

The MMDI Career Analysis Tool predicts the degree to which the individual will enjoy each career. This algorithm is based on two out of three types of factor that the MMDI validation research identified as affecting job enjoyment.

The first group of factors is inherent in the nature of the job itself. That is, irrespective of a person's preferences, there are some careers that are much more enjoyable than others. The research did not identify the reasons for this, but explanations might be suggested by the corpus of research that examines stress and motivation – e.g. having autonomy over one's working environment, getting immediate feedback on performance, etc.

The second factor is the alignment of outer and inner adaptation – i.e. the match between (a) the individual's *unique* personality profile and (b) the profile of the job (the behavioural demands of being successful in that job). A 'profile' here refers to the balance of preferences, not to a type (cateogyr). We measured the behavioural demands of a career in our validation research using the *Job Demand Questionnaire (JDQ)*. It is based on the same theory as the MMDI but with a slightly different structure: it is not a psychometric, but uses a pairs-comparison technique to prioritise behaviours. The JDQ asks people already in that career which behaviours are required to make it more successful. Our validation research (detailed later) showed that a closer match between the balance of behaviours required in the job and the balance the person prefers was associated with a greater degree of job enjoyment.

There is a third set of factors that falls outside the scope of our validation research. It's presence is suggested by the fact that there is a still a lot of variation in job enjoyment that is unaccounted for, after taking account of the inherent nature of the job and the match between the personality profile and job demands. Explanations for this might be found in research that examines how job enjoyment can be affected by local factors, such as the relationship with one's boss, flexible employment policies, etc.

When choosing a career, therefore, the ideal is to find one that is inherently enjoyable, provides a close match with the individual's personality, and meets other personal criteria for job enjoyment. The MMDI algorithm that predicts job enjoyment combines the first two of these factors.

5. TECHNICAL DIFFERENCES WITH MYERS BRIGGS

This section provides a description of the main theoretical differences between the theory and approach underpinning the Myers Briggs version of psychological type and that underpinning the MMDI. Although it is not necessary to understand these for everyday use of the MMDI, they are summarised here for completeness.

(1) Different opposites

Most type questionnaires attempt to measure, separately, four pairs of opposites that can be found in Jung's theory: Extraversion vs Introversion, Sensing vs Intuition, Thinking vs Feeling, and Judgment vs Perception. However, Jung observed that these cannot occur in isolation:

> There are no introverts and extraverts pure and simple, but only introverted and extraverted function-types, such as thinking types, sensation types, etc. (Jung 1921, p. 523)

The MMDI tests for a combination of attitude (e or i) with each of the functions (S, N, T, and F). This leads to the eight function-attitudes: extraverted Feeling (Fe), introverted Feeling (Fi), extraverted Intuition (Ne), introverted Intuition (Ni), extraverted Sensing (Se), introverted Sensing (Si), extraverted Thinking (Te) and introverted Thinking (Ti).

The results for the more popular type letters (E, I, S, N, T, F, J and P) are derived from these function-attitude results using algorithms. Furthermore, in Chapter X of Psychological Types, Jung pits these eight function-attitude against each other in four pairs: Ne vs Si, Ni vs Se, Fe vs Ti, and Fi vs Te. These are the opposites used to construct the MMDI questionnaire.

(2) Abstract/concrete and sensing/Intuition

Isabel Briggs Myers associated Sensing with "concrete" and Intuition with "abstract". However, Jung defined abstract-concrete as a separate dichotomy to sensing-Intuition, e.g.:

> There is abstract thinking, just as there is abstract feeling, sensation, and Intuition (Jung 1921, p. 410)

Conflating the concepts might mean, for example, that someone who makes use of Myers Briggs theory, but prefers "abstract sensing", might have difficulty in deciding whether their preferences are for sensing or intuition (because, in Myers Briggs theory, abstraction is associated with Intuition). The MMDI questionnaire is designed to measure sensing and intuition separately from abstract and concrete. It does not produce a score for abstract/concrete, but the statements are designed to measure all preferences assuming an equal degree of abstraction/concreteness.

(3) Active/passive

Jung identified a dichotomy of active-passive (or creative/reactive), which Isabel Briggs Myers did not appear to take into account when designing the MBTI and her type descriptions. As a result, Myers Briggs theory presents some preferences in a passive way, such as Sensing which is portrayed as receiving information (Myers 1980, p.2). Others are presented in an active way, such as Intuition which is portrayed as a creative activity (Ibid). Jung, however, stressed that the active/passive dichotomy is a separate dimension, one that is particularly characteristic of functions when they become dominant in the personality:

> Sensation, when it is the dominant function, is not a mere reactive process… but an activity that seizes and shapes its object [and so too] Intuition is not mere perception. (Jung 1921, p. 366)

To circumvent this problem, the MMDI questionnaire measures all the preferences with an equal degree of activity/passiveness, and all the descriptions are portrayed with an equal degree of activity/creativity.

(4) The middle group

As discussed earlier, Isabel Briggs Myers believed that, for each dichotomy, there were only two groups – e.g. introverts and extraverts. However, Jung believed that there were three groups (Op. Cit.). Associated with this difference is the fact that Isabel Briggs Myers believed everyone was 'a type', whereas for Jung each type was a stereotype akin to landmarks on a map (Op. Cit.). By implication, this means that for Jung the preferences are not a matter of a straight choice, but primarily a matter of the intra-personal balance and interaction between them.

The phraseology used in the MMDI reports is the *closeness* of an individual's personality to one or more personality types, which are acknowledged as being stereotypes. This does not force people into a type category, but allows them to be part of the middle group.

(5) Numbers of groups

Jung defined eight types based on the presence of a dominant function. Isabel Briggs Myers defined 16 types by adding a second function as auxiliary (e.g. ISTP is a combination of Thinking and Sensation). However, from Jung's perspective, this change in number is not significant (Jung 1921, p. 523) as it does not change the fact that they are all stereotypes.

(6) Whether type can change

Isabel Briggs Myers believed that type was inborn, and would not change. However, for Jung, psychological type was a combination of both nature and nurture, and could change throughout life as one's circumstances change and personality develops ("individuates"), e.g.:

> *Type is nothing static. It changes in the course of life*. (Jung 1959, p. 435)

The MMDI questionnaire and reports therefore allow for the prospect of change over time, e.g. due to personal development or a change in life circumstances. It provides a current snapshot of personality, and makes no claim regarding inborn disposition.

(7) The overlooked 5th function

Isabel Briggs Myers' theory is based on four functions – Sensing, Intuition, Thinking, and Feeling. However, in Psychological Types Jung also discussed a fifth function. Jung complained that this extra function was being overlooked due to readers being "led into the temptation of classifying everything" (Jung 1935, p.186).

One reason that Jung's fifth function is overlooked is that it is conceptually difficult to understand. Also, it is primarily concerned with personality development (not current personality or career choice). In view of this, the MMDI reports limit the discussion to the same four functions as in Isabel Briggs Myers' theory.

(8) Scalar vs binary opposites (balance vs type)

The MMDI questionnaire has a 6-point scale between the opposites, rather than a binary either-or choice, and presents the results in terms of balance of preferences. For example, a score of 55% extraversion and 45% introversion does not suggest the individual always prefers extraversion over introversion, but rather the degree of balance between the two that they prefer in their life. Therefore, an 'extravert' with this score, who has spent all day at work extraverting, may find they need a bit of quiet time in the evening in order to restore the right amount of balance. The MMDI does not allocate a single type to individuals.

(9) Use in career choice

The MMDI takes account of balance when matching people to careers. For example, being a lighthouse keeper is an introverted job but most introverts would not enjoy it because it involves *too much introversion*. Therefore, the MMDI Careers Report does not match people to jobs according to their type letters, but on the basis of whether the balance offered by the job matches the balance the person is looking for.

In the Myers Briggs approach, the individual completes a questionnaire (an MBTI or alternative) and then usually goes through a process of validation – i.e. confirming the assigned personality type category as correct, or changing it if is not. They then use the list of careers associated with their personality type as the basis for further consideration.

(10) Other differences

There are a number of other differences between C.G. Jung and Isabel Briggs Myers, such as whether it is possible to use opposites simultaneously (IBM says no, Jung says yes) or the value of having a clear type (IBM believes this is good, Jung says it is "deplorably one-sided" - Jung 1932, p. 89). Where possible, the MMDI follows Jung's approach in the presentation of results, but using the familiar four-letter code and language of Myers Briggs theory. The MMDI makes little reference to the more complex or advanced aspects of Jung's type theory, apart from some parts of the Type Dynamics report.

6. VALIDITY/RELIABILITY

The MMDI has two primary applications for which validation has been tested - helping the individual to:

- determine their closest personality types (stereotypes);
- identify which careers they might enjoy most.

A common method for validating a type questionnaire is to compare the results with other questionnaires, i.e. the MBTI or similar. However, this was not deemed appropriate for the MMDI because the definitions of the main concepts involved (e.g., Sensing, Intuition, Thinking, etc.) are different – due to the theoretical differences that have been discussed above. In view of this, the validation for identifying personality type and career choice was conducted in a more direct manner.

Personality Type Validation

Unlike the MBTI and similar questionnaires, the scores from the MMDI questionnaire do not directly produce a personality type. Rather, the MMDI produces four scores on the scales of the opposite Jungian function-attitudes (described as opposites in Psychological Types), which are:

- Ne vs. Si (extraverted Intuition vs introverted sensing)
- Ni vs. Se (introverted Intuition vs extraverted sensing)
- Fe vs. Ti (extraverted feeling vs introverted thinking)
- Fi vs. Te (introverted feeling vs extraverted thinking)

To determine the closest personality types, these scores are matched against average patterns of questionnaire response for each of the 16 Myers Briggs types (using an algorithm that was derived, during development, from the responses of people who declare themselves as each type). The MMDI then reports the closest two types according to the pattern-matching algorithm. There is a separate, simpler algorithm that converts the MMDI scores into balance scores on each of the personality type dimensions: EI, SN, TF, and JP.

To validate the questionnaire and type-calculation algorithm, an online validation system was constructed to compare the MMDI's prediction of type and the individual's considered view of their own type:

- Respondents completed the questionnaire

- The automated, online report started with an introduction to the concept of type validation (i.e.: reviewing/challenging the results of the questionnaire to see if they are correct).

- The system presented their matching scores for all sixteen types, and identified which were the closest and the second closest types.

- The respondent was presented with an interactive facility that allowed them to compare descriptions for any two of the sixteen types, starting with the two highest-scoring personality types. The descriptions were written to be clear and distinct, avoiding Barnum statements.

- A further screen provided a more in-depth description of any type they chose.

- Finally, based on these comparisons, they were asked whether they thought the result of the questionnaire was correct or incorrect, or if they did not know.

- At the end, the participant could provide feedback or comment on the process.

This process has some similarities to the one used by Isabel Briggs Myers in the development of the Myers Briggs Type Indicator® instrument, where she found that approximately 75% of clients agreed with the results of the questionnaire (Myers & McCaulley 1985, p.52). However, the context and mechanics of the MMDI process are different in two key respects:

- Isabel Briggs Myers obtained feedback in counselling situations, which were aimed at verifying the accuracy of the results and would therefore tend towards an agree/disagree conclusion in every case. For the MMDI, there was no imperative to come to a conclusion, as the participant could also choose a "don't know" option. Comments provided during the online feedback process suggested that most respondents who chose "don't know" as an option wanted more information in order to make a decision (which is what they would be given during a counselling session).

- The MMDI process did not involve a second person. There has been some unpublished research (conducted by John Bathurst in New Zealand, and presented at a conference of the Association of Psychological Type International) that shows people tend to validate in the direction of the preferences of the MBTI practitioner. This might be due to practitioners unconsciously presenting their own type in more positive terms than other types. In the case of the MMDI, however, there was only the individual and the internet system – no other person was involved, thereby reducing the tendency to identify with the preferences or conclusions of an administrator.

A purely random statistic in such a study would mean 6% of people would agree the MMDI result was correct (though this figure would in practice be higher due to the Barnum Effect). The results from people reviewing the conclusions of the MMDI were as follows:

MMDI result	n	%age of total
Correct	574	**69%**
Incorrect	54	**6%**
Don't Know	203	**24%**
Total	831	

Although this data and the 75% figure of the MBTI are not directly comparable, it is possible to compare the validity of the MMDI by considering three scenarios: (a) best case, (b) worst case, and (c) average:

Best Case

To produce the best case scenario, we remove all the "don't knows" and consider only the results of those who were able to make a decision on the basis of the information they were given. That is, 574 people believe the MMDI conclusion about their type was correct, and 54 believed it was incorrect. That is an accuracy rate of 91%, which compares very favourably with the MBTI's 75%.

Worst Case

To produce the worst case scenario, we make the assumption that the MMDI result for all the "don't knows" is incorrect. This would mean the MMDI has an accuracy rate of 69%. This is slightly inferior to the MBTI's reported accuracy of 75%, but still substantially above the result expected at random of 6%.

Average Case

If we assume that the result was correct for 50% of the don't knows, this means that the MMDI produced a correct result in 675 out of 831 cases, which is an accuracy rate of 81%. This result is slightly better than the MBTI's 75%.

This validation data suggests that the MMDI does a reasonably good job of what it claims to do – i.e. helping people determine the closest personality types (stereotypes) to their own unique personality.


Career Enjoyment Validation

The second main application of the MMDI (in addition to the one discussed above) is career choice – i.e. using personality preferences to identify careers that are most likely to be enjoyable. To validate its use in in this application, another closely-related questionnaire was used - the Job Demand Questionnaire (JDQ). The JDQ uses similar function-attitude statements to the MMDI, but with two key differences:

- The mind-set for the questionnaire is job-related. That is, respondents are asked to identify which behaviours are required to be successful in their current job.

- The questionnaire uses the technique of pairs comparison. That is, statements associated with each function-attitude are compared with all other function-attitudes. This technique identifies which are the most important function-attitudes in the relevant context.

An algorithm was developed (called the matching score) to measure the difference between the JDQ score for the individual's current job and their MMDI score. In addition, respondents were asked to rate their enjoyment of that job. The total data produced by this exercise for participants was therefore:

- The individual MMDI profile (recorded in a four letter code such as *hrkl* which has over half a million variations and shows the balance they prefer between each of the Jungian function-attitudes).

- A similar code that identifies the demands of the job.

- A matching score, to show how close the demands of the job were to the individual's preferences.

- An enjoyment score (self-rated by the person doing that job).

The following graph shows the relationship between job enjoyment and matching score.
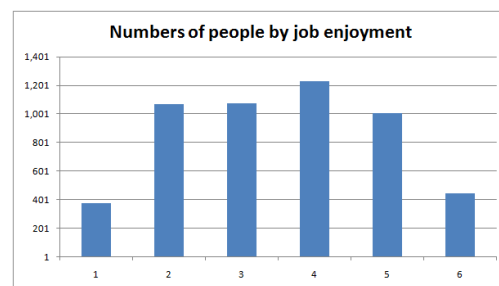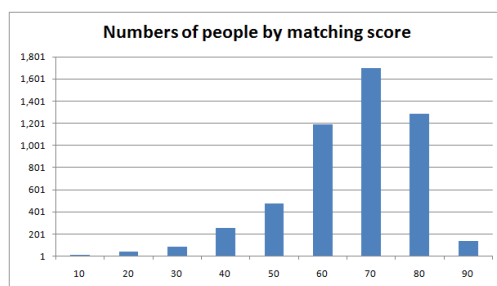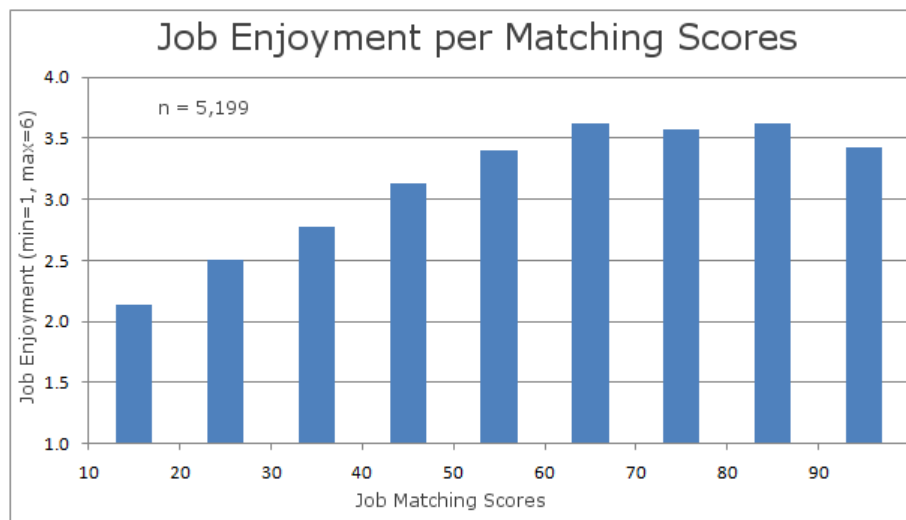
These results show that there is a relationship between job enjoyment and job/personality match. However, the relationship is not linear: job enjoyment peaks when the job match falls into the range 65%-90%, as can be seen in the trendline:
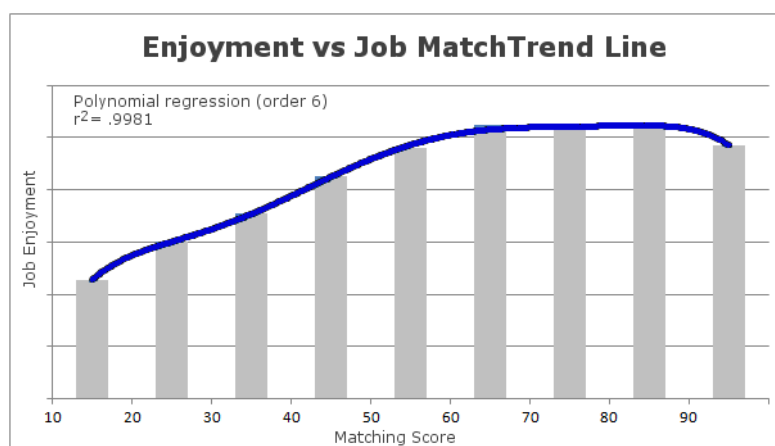
There are some limitations that need to be borne in mind when considering this data. For example, the MMDI identifies current personality only, and there are other factors that influence job enjoyment. Neverthless, this data provides validation evidence for the use of the MMDI matching algorithm in helping to identify the more enjoyable careers for an individual. This algorithm is used in the MMDI predictions of career enjoyment.

Factor Analysis (likert version)

The structure of the MMDI is ipsative (having statements that pair the eight function-attitudes, with a 6-point scale between them). The questionnaire was converted into a form suitable for confirmatory factor analysis of the eight function-attitudes separately - using individual statements with responses on a likert scale. A randomly-selected but evenly-distributed set of responses was collected (i.e. 30 random records from each of the groups that scored most highly on each function attitude). The responses were then corrected for response bias (the tendency to answer always towards the right or to the left), and then subjected to a confirmatory factor analysis. This factor analysis produced 8 factors, as expected, for each of the Jungian function attitudes (Fe, Fi, Ne, Ni, Se, Si, Te and Ti). The inter-item correlations (after correcting for response bias) were:

Inter item correlations

n=240

	Fi	Ne	Ni	Se	Si	Te	Ti
Si						.13	.37
Se					.05	.46	-.20
Ni				-.59	-.22	-.53	.06
Ne			.08	-.23	-.28	-.28	-.18
Fi		.03	.01	-.21	-.29	-.43	-.48
Fe	.33	.09	.03	-.17	-.5	-.43	-.56

Te: Ti = .05

Internal consistency

Function attitude	Co-efficient alpha	(Eigen value)
Te	0.92	10.7
Ni	0.91	7.5
Fe	0.92	5.0
Ti	0.85	2.3
Fi	0.87	1.9
Se	0.83	1.8
Ne	0.81	1.4
Si	0.82	1.3

Factor Analysis (ipsative version)

The questionnaire was then restored to the ipsative format, pitting opposite function-attitudes against each other, and subjected to a further factor analysis. This was updated in 2010 with a fully random selection of 999 records, using Winstat (Kaiser Normal, Varimax Rotation). Four factors were produced, with items loading on each scale as expected:

	Factor 1	Factor 2	Factor 3	Factor 4	Commu-nality
NiSe1	**0.71**	-0.07	0.19	0.04	0.55
NiSe0	**0.67**	0.01	0.18	0.11	0.50
NiSe2	**0.66**	-0.01	0.13	0.02	0.45
NiSe5	**0.61**	-0.02	0.08	0.10	0.39
NiSe4	**0.60**	-0.03	0.11	0.11	0.38
NiSe7	**0.54**	0.10	0.07	-0.09	0.31
NiSe6	**0.46**	-0.07	0.14	-0.14	0.25
NiSe3	**0.27**	-0.10	0.08	0.03	0.09
NiSe8	**0.21**	-0.10	0.03	0.15	0.08
FeTi1	-0.14	**0.66**	-0.01	-0.01	0.45
FeTi0	-0.13	**0.66**	-0.08	-0.13	0.47
FeTi2	-0.09	**0.63**	-0.07	-0.10	0.42
FeTi8	0.06	**0.60**	0.24	-0.07	0.43
FeTi4	-0.02	**0.55**	-0.08	0.02	0.31
FeTi5	-0.02	**0.51**	-0.06	0.17	0.29
FeTi6	0.05	**0.47**	0.11	0.08	0.24
FeTi3	-0.10	**0.41**	0.19	0.10	0.23
FeTi7	0.01	**0.38**	-0.04	-0.13	0.16
FiTe6	0.04	0.06	**0.65**	0.04	0.42
FiTe8	0.16	0.19	**0.53**	0.07	0.35
FiTe4	0.20	-0.07	**0.52**	0.17	0.34
FiTe2	0.11	-0.04	**0.48**	-0.06	0.24
FiTe5	0.14	0.06	**0.43**	-0.17	0.24
FiTe3	0.08	0.03	**0.35**	-0.01	0.13
FiTe0	0.29	-0.19	**0.35**	-0.11	0.26
FiTe7	0.08	-0.05	**0.31**	0.21	0.15
FiTe1	0.18	-0.04	**0.23**	0.15	0.11
NeSi5	-0.03	0.02	-0.05	**0.57**	0.33
NeSi0	-0.03	-0.17	-0.00	**0.54**	0.32
NeSi4	0.06	-0.05	0.01	**0.50**	0.25
NeSi2	-0.17	0.20	-0.14	**0.49**	0.33
NeSi1	0.10	0.04	0.16	**0.42**	0.21
NeSi7	0.20	0.05	0.07	**0.37**	0.19
NeSi3	0.19	0.01	0.21	**0.35**	0.20
NeSi8	-0.16	-0.07	-0.11	**0.28**	0.12
NeSi6	0.12	0.22	0.12	**0.26**	0.15
Sum of Squares	3.19	2.99	2.16	2.01	10.35
Percent of Variance	8.86	8.30	6.01	5.59	28.76

Factor	Eigenvalue	Variance (percent)	Percent cumulative
1	4.16	11.55	11.55
2	2.98	8.28	19.83
3	1.95	5.41	25.24
4	1.27	3.52	28.76

Test-retest reliability

The following are test-retest reliability scores based on matching people from 1st to 2nd test by name and IP address. Although most of these are likely to be the same people, there may have been some instances of the same names being used by different people. These are therefore minimum scores as, in some cases, the inclusion of retests for different people will have artificially deflated the reliability score.

| Scale	Overall	Same Day	2-7 days	8-30 days	31 days-1 year
NeSi	.73	.78	.66	.64	.59
NiSe	.79	.81	.76	.75	.71
FeTi	.79	.83	.72	.72	.67
FiTe	.73	.75	.73	.72	.61
n=	3748	2379	515	366	488

7. NOTE ON INTERPRETATION OF SCORES

Much of the interpretation of results is contained in the MMDI reports, so will not be repeated here. In a small number of cases, however, some results in the report may seem to be contradictory. There is an explanation of those differences in the Type Dynamics Report, but further (simpler) explanation is provided here.

Apparent contradictions in MMDI results are due to different methods of scoring and ways of looking at the results. These reflect (in part) some of the differences between Isabel Briggs Myers' and C.G. Jung's versions of the theory. For example, the diagram (right) shows an individual's results presented in an MMDI wheel. Lighter segments suggest a higher score (i.e. higher degree of preference). The results associated with this profile are:

1. Closest type is ENFP, second closest is INFJ.

2. Extraversion scores 48%, introversion scores 52%

There might seem to be a discrepancy because result (1) suggests the individual prefers extraversion, and result (2) suggests introversion. The reason for this is that each segment represents a behavioural style, and the individual uses all of them. Result 1 says that ENFP is the highest score (lightest) of the 16 segments – i.e. the individual prefers to use that style more than any of the others. However, result 2 compares the totality of the outer ring with the totality of the inner ring. When they are aggregated together the inner ring scores higher (it is slightly lighter overall). That is, the individual prefers an overall balance in which, although ENFP is the style used most often, there is a collective preference towards using the inner eight styles slightly more than the outer eight.
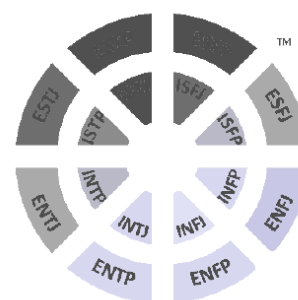
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