PROFILING REPORT

PSYCHOMETRIC BACKGROUND & DEVELOPMENT

CRITERIA FOR RESEARCH.

PROFILING REPORT

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Criteria for Research

Introduction

The Meta Dynamics™ Profiling Tool is a 16-dimension questionnaire that assesses an individual's preferences particularly in the everyday context. Each dimension refers to a specific part of thinking styles such as influencing, resiliency, outcome focused etc.

The questionnaire requires an individual to respond to behavioural statements such as "I influence people's opinion" in terms of their agreement or disagreement with the item. Similarly to most personality and behavioural assessments such as the Occupational Personality Questionnaire and eDISC, the Meta Dynamics™ Profiling Tool also links back to the NEO-PI(R) Personality Test, MBTI and Big 5 model of personality which has long become a widely accepted model of personality and behavioural assessments for decades.

Phase 1 Development

- Sample size: 50+ Initial Profiles
- Development timeline: Dec 2013 to April 2014
- Defining ESIP & establishing research hypothesis
- Determining global factors & operational definition, primary factors & operational definition
- 466 initial test items mapped to 57 primary traits mapped to Big 5, NEO-PI, MBTI, OCEAN, DISC, OPQ
- Scores weighted and standardized on the Likert Scale from 1 to 10

Phase 2 Development (beta version)

- Sample size: 500+ Beta Profiles
- Development timeline: April 2014 – April 2015
- Completion of online test platform and downloadable individual reporting
- 6 primary characteristics statistically eliminated from 52 to 46 in Beta version
- 560 expanded items mapped to 41 primary characteristics and 16 factors through SPSS Factor Analysis
- Determining ipsative pairs & reverse items
- Test redesigned as ipsative assessment with 560 test items organized in 140 quadrants

Phase 3 Development (current version)

- Sample size of MDPT(i) Full Profile: 1109 at last update
- Sample size of Mini Profiles: 3953 at last update
- Development timeline: April 2015 to present
- 5 primary characteristics statistically elimited from 46 to 41 in current version
- 280 items distilled down from 560 items in Beta version. organized into 70 quadrants, measuring 41 primary characteristics, mapped to 16 dimensions, factored to E.S.I.P Critical Alignment Model with Self / Other dimensions and added reporting on Social Desirability Scale
- Applied multi-dimensional forced choice to reduce distortion in candidates responses
- Development of written narratives
- Development of current reporting format
- Improvements to functionality of Client Management System on the Profiling Tool Platform
- Development of the Mini Profile

Psychometric Background & Development

OF THE META DYNAMICS™ PROFILING TOOL

Construction of the Tool

DEVELOPMENT OF PRIMARY CHARACTERISTICS

The development of the MDPT(i) was based primarily on years of experience and findings from extensive coaching sessions and research on the relationship between thinking styles and leadership. Factors are determined based on the E.S.I.P. Critical Alignment Model.

The structural definitions, including item content was examined to determine similarities and dissimilarities of content between personality and behavioural models such as the Occupational Personality Questionnaire, NEO-PI(R), MBTI, eDISC and Big 5 model, and the E.S.I.P. Critical Alignment Model.

The results of this examination revealed a total of **57 primary characteristics** from the personality and behavioural models and **41 primary characteristics from the E.S.I.P. Critical Alignment Model**. Primary characteristics were then regrouped based on similarity and likeness, (e.g. Socially Confident and Outgoing) and integrated to form a single primary characteristic.

The grouping of characteristics was based on a logical and non-statistical clustering of the content. Characteristics that were not theoretically linked, that were not represented in the E.S.I.P. Critical Alignment Model, were eliminated. Following the regrouping and integrating of the remaining factorial characteristics, 41 primary characteristics were identified.

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ITEM SELECTION

The item selection process rendered a minimum of 12 items per scale, 560 items in all. Items were also selected to attain a balance between positively worded and negatively worded items. This was important to reduce the potential of test sabotaging by certain items contaminating the response selected on the following item i.e., 'yea saying' or 'nay saying'.

The beta version of the MDPT was piloted early in 2014 and included 16 dimensions and 560 items. Item analysis revealed that scales possessed strong internal consistency and that it was possible to reduce the number of items per scale without losing significant reliability of the scales.

Accordingly, the lowest correlating items were discarded which in certain cases increased the internal consistency of some scales. In order to maximize both the reliability and efficiency of the instrument, 7 items were retained per scale. This resulted in the final version of the MDPT(i) having 280 items in total, although there is an **ongoing process of item refinement based on statistical analysis.**

ITEM PLACEMENT

Once items had been established, they were placed in the final format using a rotation process, also known as counterbalancing. This ensured items from each scale, including negatively and positively worded items, were distributed evenly throughout the instrument.

RESPONSE FORMAT

QUESTION 1	MOST	LEAST
I can quickly see patterns in complex problems	×	
My team's opinion is important for me to make decisions		
I recover quickly after a client says no to me		
I consider the subtleties of what is said		×

POSITIVE IMPACT SCALE / SOCIAL DESIRABILITY

All self-report measures rely on the accuracy of the information provided by the test taker / candidate. Accordingly, self-report measures of any construct are always subject to response bias, including a tendency to make a positive impression by providing socially desirable responses. In certain situations people may deliberately distort their response in the interests of secondary gain. For example, an applicant for a job requiring certain skills, may be reluctant to admit to a lack in some areas. Sometimes, response bias may not reflect a deliberate attempt to deceive, but rather a lack of awareness of one's own shortcomings.

In order to combat these types of problems, self-report measures can include scales that measure the amount people are distorting or are otherwise open to the effects of socially desirable responding. The MDPT(i) includes the Social Desirability Scale as a measure of validity.

The Social Desirability Scale was designed to detect respondents who may be giving an exaggerated positive impression of themselves. Elevated scores on this scale may also indicate that a person holds very high moral standards or lack psychological insight.

Items were generated by, identifying content from other well validated instruments such as the MMPI-2 and MBTI that possess sophisticated validity indicators. Items were considered that pulled for social desirability on the one hand, and items biased towards denial of shortcomings on the other. The Social Desirability Scale contains **72 items that deny minor human flaws and assert virtues that most individuals do not feel the need to deny or assert when taking the MDPT(i).**

When scores reach or exceed two standard deviations from the mean in the positive direction, the results are considered invalid from a psychometric point of view. Scores of this magnitude may indicate that an individual has likely approached the assessment task by being overly concerned to create a positive impression or experiences a lack of self-awareness.

Psychometric Properties & Research

NORMATIVE DATA. RELIABILITY, AND VALIDITY

DEFINITION: Psychometrics is concerned with the scientific measurement of psychological theory and the techniques involved in psychological measurement. The psychometric structure determines the precision of a psychological inventory.

In the process of developing the MDPT(i), normative data was collected and psychometric analyses were conducted to obtain information on its reliability and validity. Norms are important because they establish a baseline against which people's scores can be compared. Reliability is concerned with how consistently the tool measures what it is supposed to measure, whereas validity endeavours to determine how well the tool is measuring what it claims to measure. This section provides data on the psychometric properties of the MDPT(i).

NORMATIVE DATA

DEFINITION: Norms are a set of average scores that are used to compare how large, representative groups of people perform on a particular survey or instrument. They serve as a benchmark to compare scores from individuals who complete the MDPT(i). This information is needed to understand how one individual's score compares to others who have completed the tool.

The MDPT(i) was developed by collecting normative data from a relative group of 535 professional individuals from several countries including: Australia, New Zealand, and Europe. Candidates consisted largely of individuals from a diverse range of professional occupations and included students, the majority of whom were completing advanced coaching qualifications. In addition, a number of individuals had previously completed the eDISC, MBTI, and LQ assessment; providing prior experience to assessment testing.

The following table contain the basic demographic breakdown of the normative sample.

Table 1.1

Age by Gender of Normative Sample

Age	Females	Males	Total
Under 20	0	0	0
20 – 29	17	3	20
30 – 39	162	85	247
40 – 49	125	95	220
50 or Over	20	28	48
Total	324	211	535

Table 1.2

Occupational Group	Number (n)	Percentage (%)
Business	289	54.01
Education	52	9.72
Coaching	154	28.79
Other	40	7.48
Total	535	100

MEANS AND STANDARD DEVIATIONS

DEFINITION: By adding all the scores in the normative sample and dividing by the total number of scores we are able to establish the average or mean of a set of scores. Once this is set it is then important to know how much above or below the average a score falls. This involves calculating the "Standard Deviation" (SD) that measures the distribution of scores, that is, how far from the mean the scores fall. The more the scores cluster around the mean, the smaller the standard deviation.

In a normal distribution, 68.3% of the scores are within one SD above and one SD below the mean. In a similar manner to IQ tests, studies have shown that primary characteristics in personality assessments are distributed normally in the general population. This means that 68% of all scores fall within one standard deviation of the average, 95% of the scores will fall within two standard deviations of the average, and 99% of the scores will fall within three standard deviations of the average.

The means and standard deviations shown in Table 1.3 represent the general norms used by the MDPT(i). On the MDPT(i) model of E.S.I.P. Critical Alignment Model, the total score on all of the dimensions reflect a moderately negative skew, which means that there are less scores at the lower end of the scale. On the whole, however, scores on all dimensions approximate a **normal distribution**.

Table 1.3

Subscale / Dimension	Mean	SD	Skewness	Kurtosis
Visionary	91.8214	15.53742	-1.005	.562
Sustained Vision	32.1786	7.15466	-.619	-.168
Personal Strengths	99.7857	11.29194	-1.276	3.135
Self-Actualisation	95.7857	13.56017	-.100	-.741
Strategic Thinking	52.7857	10.65053	.354	-.892
Innovation Management	39.5000	4.34187	-.370	.058
Planning	39.9286	12.07976	.241	-.597
Decision Making	30.4286	3.63551	-.064	-.929
Autonomy	40.0714	5.61696	-.921	3.001
Outcome Focused	137.3214	15.78338	-1.297	2.567
Orderliness	63.8929	12.14523	.606	.171
Monitoring	60.9286	6.54290	-1.218	3.782
Mentor	32.4286	10.86083	-1.194	1.052
Connection	67.3571	10.11861	-.362	-.865
Social Expertness	45.4286	11.77703	-.814	.726
Mindfulness	52.3571	9.58090	-.199	-.105

STANDARD SCORES

Each scale (primary characteristic) on the MDPT(i) has a different mean and standard deviation. In order to be able to compare scores on one scale with scores on another scale, it is necessary to standardise the scores relative to their distribution on each scale.

One way of achieving this is to convert raw scores into standardised scores. Standard scores have the same mean and standard deviation and enable more accurate comparisons to be made between a score on one scale and a score on another. The standard score calculation will vary depending on the distribution of responses on each scale.

The MDPT(i) uses a mean of 100 and a standard deviation of 15 to convert raw scores into standard scores.

Given that the MDPT(i) has a development focus – that is, it focuses on how an individual can improve the quality of their leadership behaviour – scores on the MDPT(i) are expressed as such. A standardised score (STEN score) between 1-2 are described as **"Stretch"**, scores between 3-4 as **"Opportunity"**, scores between 5-6 as **"Effective"**, scores between 7-8 as **"Strength"** and scores between 9-10 as **"Signature".**

Research Reliability

DEFINITION: Reliability is the extent to which test scores are consistent and relatively free of random errors of measurement. Reliability is established when test scores for a group of respondents are consistent over repeated administrations of the assessment over time. The most commonly addressed includes internal consistency and test-retest reliability.

INTERNAL CONSISTENCY

DEFINITION: Internal consistency is the degree to which the items of a particular scale (primary characteristic) measure the construct (dimension) that the scale was designed to measure. It measures whether several items that propose to measure the same general construct produce similar scores.

Internal consistency is usually measured with Cronbach's alpha, a statistic calculated from the pair wise correlations between items. Internal consistency ranges between zero and one. A commonly accepted rule of thumb is that **an alpha of 0.6 – 0.7 indicates acceptable reliability, and 0.8 or higher indicates good reliability.**

Table 1.4 contains the internal consistency coefficients for the MDPT(i) scales based on 535 participants. The average Cronbach alpha coefficients are high for all of the scales, ranging from a "low" of -.044 and .009 (Agreeableness and Creativity) to a high of .906 (Risk Taking), with an average internal consistency coefficient of 0.607. **These results suggest good reliability.**

Table 1.4

Scale	Number of Items (n)	Cronbach Alpha Coefficient
Abstract	7	.378
Achieving	14	.814
Adaptable	14	.594
Affiliative	18	.656
Agreeableness*	8	-.044
Assertiveness*	2	.524
Behavioural	12	.724
Confidence*	15	.435
Conscientiousness	10	.768
Consultative	6	.404
Controlling	12	.835
Creativity	5	.009
Credible	6	.482
Curiosity*	14	.767
Data Rational	8	.630
Decisive	7	.230
Deductive Reasoning	20	.764
Detail Conscious	14	.859

Efficiency	5	.151
Evaluative	8	.206
Focus	7	.567
Forward Thinking	15	.607
Goal Setting	14	.788
Independent Minded	9	-.007
Internal Locus of Control	21	.654
Intrinsically Motivated	15	.678
Modest	14	.855
Motivator	10	.782
Openness to Experience	9	.566
Organised	15	.825
Outgoing	14	.838
Outspoken	10	.787
Perceptive	14	.675
Prepared	12	.618
Prioritisation	11	.406
Problem Solving	14	.867
Process Driven	17	.814
Resilience	38	.808
Risk Taking	14	.906
Self-Efficacy	12	.847
Social Boldness*	8	.738
Socially Confident*	14	.892
Systematic	7	.586
Time Management	15	.376
Tough Mindedness	10	.485
Variety Seeking	16	.775

**Scales removed from final version*

On further research and development, Table 1.5 presents the final reliability for the MDPT(i)'s 16 dimension and the Cronbach Alpha for the dimensions respectively. Primary characteristics that do not measure a dimension was removed, and primary characteristics that measures similar constructs were collapsed, thus resulting in 41 primary characteristics instead of 46 as per the beta version of MDPT. **These results suggest very high reliability.**

Table 1.5

Dimension	Number of Items (n)	Cronbach Alpha Coefficient
Visionary	75	.873
Sustained vision	26	.785
Personal strengths	88	.692
Self-Actualisation	75	.852
Strategic Thinking	50	.810
Innovation Management	24	.758
Planning	57	.841
Decision Making	52	.708
Autonomy	37	.778
Outcome Focused	119	.778
Orderliness	68	.799
Monitoring	68	.764
Mentor	40	.904
Connection	68	.776
Social Expertness	48	.894
Mindfulness	47	.753

Research Validity

DEFINITION: Validity is an important psychometric indicator of the soundness of a measurement tool that evaluates the instrument's ability to measure what it is supposed to measure, and the extent to which it can predict related outcomes.

CONTENT AND FACE VALIDITY

DEFINITION: Face validity is the extent to which items on a test appear to be meaningful and relevant to the construct being measured.

All items on the MDPT(i) have been operationalised to reflect behaviour appropriate to the particular construct being measured.

FACTORIAL VALIDITY

To establish the factor structure of the MDPT(i), a factor analysis of the 16 dimensions that made up the E.S.I.P. Critical Alignment Model categories was conducted.

The following criteria were utilised:

1. A criteria of eigenvalues greater than 1;
2. Minimum of 3 items per factor; and
3. Items retained in each factor having a factor loading greater than 0.45.

The initial factor analysis produced 5 factors with an eigenvalue greater than 1; however the 2 remaining criteria were not met. A 5-factor solution of the Principal Component analysis (with a varimax rotation) afforded the greatest interpretability and satisfied the three criteria mentioned above. The 5-factor solution revealed a total of approximately 85.05% of the variance.

Table 1.6

Factor	% of Variance	E.S.I.P. Scale Equivalent
1	39.283	Environment
2	19.622	Structure
3	12.762	Implementation
4	6.921	People
5	6.463	Extraneous / Outliers

Taken together, these factors **closely resemble the four domains identified by the E.S.I.P. Critical Alignment Model i.e., Environment, Structure, Implementation, and People.**

CONSTRUCT VALIDITY

DEFINITION: Construct validity is the extent to which psychological test measures a psychological construct. Construct validity is established through its internal test structure, the content of the test, and the interrelations of the test scores with other tests alike.

To estimate the degree to which any two measures are related to each other, a correlation coefficient is used to examine the pattern of intercorrelations among our measures. Correlations between theoretically similar measures should be "high" while correlations between theoretically dissimilar measures should be "low".

The MDPT(i) scales was correlated with the NEO PI-R, hypothesised to have a particular theoretical relationship to MDPT(i). Nine such scales provided a direct comparison and is presented in the table below.

Table 1.7

	N	E	O	A	C
Intrinsically Motivated	-.10	.26	.31	.25	.21
Resilience	-.53	.33	.23	.27	.54
Outspoken	-.32	.42	.32	.00	.37
Openness to Experience	-.44	.39	.49	.19	.39
Achieving	-.27	.32	.30	.23	.47
Self-Efficacy	-.37	.31	.26	.22	.43
Outgoing	-.16	.37	.38	.42	.35
Perceptive	-.20	.28	.29	.45	.12
Adaptability	-.25	.28	.62	.15	.27

N = Neuroticism; E = Extraversion; O = Openness; A = Agreeableness; C = Conscientiousness

The results in Table 1.7 suggests that scales on the MDPT(i) have construct validity with the Big 5 factors of personality. It is noted, however, that the majority of correlations are relatively low. Indicating that the MDPT(i) may be measuring something other than simply personality. **This is complimentary to the construct that the E.S.I.P. Critical Alignment Model measures thinking styles using underlying personality traits as measurements.**

Notes