

TECHNICAL GUIDE & USER MANUAL MOTIVATION+

This manual has been created by the psychologists from the Science and Innovation Department of Central Test.

The assessment MOTIVATION+ / MOTIVATION and the Central Test logo are registered trademarks.

No reproduction, modification or adaptation is permitted without the written consent of the publisher Central Test.

Table of Contents

Introduction	5
1. General Description and Applicability	6
1.1. Main Areas of Application	8
1.2. Questionnaire Structure	8
1.3. Mode of Administration, Languages and Special Requirements	10
1.4. Social Desirability	10
1.5. Test-taker Requirements and Recommendations	11
1.6. Administrator Qualifications and Recommendations	11
1.6.1. <i>Testing Conditions</i>	12
1.6.2. <i>Answering Questions</i>	13
1.7. Technical and Security Issues	13
1.7.1. <i>Respecting the Ethical Charter</i>	13
1.7.2. <i>Confidentiality and Security of User Data</i>	14
1.7.3. <i>Hardware Architecture and Server Availability</i>	14
1.7.4. <i>Computer-generated Reports</i>	15
1.8. Supply, Conditions and Availability	15
2. Conceptual and Practical Scale Development	16
2.1. Theoretical Background	16
2.2. Development of MOTIVATION+	21
2.2.1. <i>Groups, Factors and Item Construction</i>	22
2.2.2. <i>Ipsative Response Format</i>	22
2.2.3. <i>Satisfaction Scale's Likert Format</i>	23
2.2.4. <i>Pre-tests and Pilot Study</i>	26
3. Scoring	27
3.1. The Relationship between Raw Scores and Norms	27
3.2. Transforming Raw Scores into Standardised Scores	29
3.5. Creating In-house Norms	31
3.6. Link between Scores and Report Content	32
4. Sample Descriptives	33
5. Norms	35
6. Reliability	50

6.1. Empirical Reliability	50
7. Validity	52
7.1. Concurrent Validity	52
7.2. Construct Validity	56
<i>7.2.1. Inter-factor Correlations</i>	<i>56</i>
<i>7.2.2. Confirmatory Factor Analysis</i>	<i>59</i>
7.3. MOTIVATION+ and Equal Opportunities	59
8. Additional Information and Considerations	69
8.1. Interpreting Scores	69
8.2. Organisational Need: Career selection, Recruitment and Development	70
References	72

Introduction

MOTIVATION+ is a psychometric evaluation tool, designed to analyse an individual's motivations, values and satisfaction at work. Consisting of 41 questions, it is a useful and relevant tool for recruitment, performance review, career and self-development, training or establishing management policies.

Another version of **MOTIVATION+** is **MOTIVATION**. The difference between the two versions is that **MOTIVATION+** has an additional scale to measure an individual's job satisfaction. While **MOTIVATION+** consists of 40 questions assessing an individual's motivations plus an additional question to assess the individual's job satisfaction, **MOTIVATION** consists of only 40 questions evaluating an individual's motivations.

MOTIVATION+ is especially useful for different processes of companies and organisations such as performance evaluation, personal and professional development, support in intervention programmes and / or for the review of policies. **MOTIVATION**, on the other hand, is exclusively suitable for the selection and hiring processes.

The assessment provides an in-depth analysis of a candidate's preference for certain values in a working environment, based on 15 fundamental values. The scale was specifically developed to evaluate values at work because a person's behaviours, choices and attitudes are driven by values. Thus, the profiles generated by **MOTIVATION+** will help decision-makers optimise the match between individuals and their work, team and organisation.

MOTIVATION+ is validated via a sample of 915 professionals from a variety of occupations, educational levels and age groups. Due to its robust psychological approach and practitioner-based results, the assessment can be utilised by decision-makers in the field of HR, management, work psychology, coaching, training and consulting, worldwide.

There are several features that make **MOTIVATION+** especially interesting. These include:

- Contemporary and business relevant items
- Compositional / integrative response format with 3 levels
- Short questionnaire length with only 41 questions
- Average completion time of 12 minutes
- Practical and easy-to understand results
- User-friendly and customisable reports that can be easily tailored
- Developed in multiple languages simultaneously
- Valid and reliable, with studies conducted on professionals from multiple countries

In this technical guide & user manual, you will find useful information about the assessment, its development, theoretical background, psychometric properties and practical applications. Chapters 1, 2, 3 and 8 are specifically tailored for HR practitioners whilst chapters 4, 5, 6 and 7 consist of detailed technical and psychometric information.

1. General Description and Applicability

MOTIVATION+ provides a comprehensive account of an individual's motivational profile, with insights into what drives them to be more committed, involved, and efficient in their job. The assessment is based on basic individual values, or more precisely, work values, to provide psychologists and HR professionals with an accurate tool to identify what drives and moves an individual at work.

The underlying logic in using work values to understand an individual's motivation is that they offer a solid theoretical background, low volatility in time and evident inter-individual variations.

The list of the motivators or factors measured in **MOTIVATION+** is provided below, along with their definitions. These factors are categorised into their relevant work value groups.

Social Motivators

The work value group '**Social Motivators**' encompasses those values that relate to an individual's social surroundings. Consisting of 'Social Environment,' 'Social Utility,' 'Idea Sharing,' 'Influence' and 'Developing Others,' these values enable a person to build upon and strengthen the social relationships that they have at work, and to help and support others.

1. **Social Environment** - People that are motivated by the social environment at work appreciate working in a friendly workplace where they can count on and turn to their colleagues. They see interacting with others around them as an important way to help maintain office harmony. Working in a company that promotes such an environment will allow them to feel enthusiastic and driven about their work.
2. **Social Utility** - People that are motivated by social utility at work place high importance on being able to benefit others with their work. They feel driven when they can take part in tasks that they know will help others.
3. **Idea Sharing** - People who are motivated by this value are driven by an environment where their ideas are appreciated and listened to. They feel motivated when they are encouraged to share their thoughts and when attention is paid to their suggestions.
4. **Influence** - People who are motivated by influence like to be able to impact work outcomes through their involvement in the reaching of important conclusions. They feel driven when they can have a say in important decisions that will affect projects.
5. **Developing Others** - Individuals that are motivated by developing others feel driven when they are able to pass on their skills and knowledge. They value the opportunity to transmit their capabilities and expertise to others.

Personal-development Motivators

The work value group '**Personal-development Motivators**' relates to the values that contribute to an individual's professional self development and growth. Consisting of 'Surpassing', 'Competition', 'Intellectual Curiosity', 'Career Opportunities' and 'Appraisal', these values enable employees to advance in their job, and achieve success.

1. **Surpassing** - People that are motivated by the value surpassing like to have opportunities to exceed themselves. They feel driven when their work provides them with opportunities that push them out of their comfort zone and test their limits.
2. **Competition** - Individuals who feel driven by competition at work will feel stimulated by an environment that enables them to try to outperform others. They will be motivated by a workplace that encourages friendly contests between co-workers to reach targets or goals.
3. **Intellectual Curiosity** - This factor refers to feeling motivated at work when acquiring new knowledge. People who are driven by this value like to work on tasks where they are able to discover new topics in order to broaden their horizons. They feel fuelled when they are able to satisfy their desire to learn.
4. **Career Opportunities** - Individuals who are driven by career opportunities seek to climb up the career ladder, and appreciate chances for promotion. As a result, they will feel motivated when their job gives them the possibility to advance the status of their career.
5. **Appraisal** - People that are motivated by appraisal like to have regular evaluations from their co-workers, or superiors, regarding the quality of their work. Being informed on how they are doing and about how others perceive their work will enable them to feel driven and on the right track in the projects that they undertake.

Contextual Motivators

The '**Contextual Motivators**' work value group relates to the extrinsic motivations of an individual provided by the company, and encompasses 'Mobility', 'Remuneration', 'Well-being', 'Security' and 'Autonomous Working Conditions'. These can be defined as the values which enable a person to gain some form of external reward, and tend to be additional aspects to a person's work itself.

1. **Mobility** - Individuals that are motivated by mobility like to have a job that allows them to move from place to place, rather than remaining at a desk for most of their schedule. Leaving the office on a regular basis will allow them to feel driven in the work they are undertaking.
2. **Remuneration** - Those that are driven by remuneration feel motivated by jobs with factors such as high salary and other material rewards. Bonuses and additional benefits are important to them in order to feel enthusiastic about the work that they undertake.
3. **Well-being** - This factor refers to those who feel motivated in their job when their

company places importance on their well-being. Factors such as a good balance between work and private life are crucial to them, and they will feel driven if their employer recognises the importance of occupational health.

4. **Security** - Those that feel driven by security like to be assured that they have a long-term, permanent position that is not likely to change anytime soon, unless they wish it to. If their position is secured in such a way and they know that they are able to remain within the company for the long haul, they will feel driven and enthusiastic in their role."
5. **Autonomous Working Conditions** - People who are motivated by autonomous working conditions value liberty in their working approach. They are motivated when their company offers flexibility, such as having independence in deciding how they proceed on their projects and tasks, and the ways in which they work.

1.1. Main Areas of Application

MOTIVATION+ was specifically designed to help companies achieve a better understanding of what motivates people to succeed and in what type of position, job, and environment they will be the most productive. It may be used throughout an employee's career-span, or to optimise a company's internal processes such as:

- **Recruitment** - With **MOTIVATION+**, you can assess whether a candidate's values match the culture of your organisation.
- **Career Management** - You can find out whether an individual's motivations allow them to succeed in the function and the position they strive for.
- **Internal Mobility** - By assessing your employee's motives and values, you will be able to implement changes that will lead your employees to reinforce their involvement and be more enthusiastic and engaged at work.
- **Prevention of Psychosocial Risks** - With **MOTIVATION+**, you can identify sources of employee dissatisfaction and pinpoint areas for improvement. You will thus be better equipped to prepare courses of action to reduce employee stress as well as undesirable behaviours at work.

The questionnaire can also be used in conjunction with other occupational-based assessments to acquire a more comprehensive profile of individuals in specific roles. For example, combining **MOTIVATION+** with **EMOTION 2©** provides in-depth insight into whether an individual is well-suited to obtain a leading position at work, by providing information on whether the individual's values are a good fit for their job as well as their ability to motivate themselves to achieve goals and maintain a good relationship with their team.

1.2. Questionnaire Structure

MOTIVATION+ consists of 41 questions and is divided into two parts. The first part assesses an individual's motivational factors and comprises 40 questions that are

presented in a compositional or integrative format. Each question consists of three statements that require the test-taker to indicate the extent to which the statements are preferred to each other. In order to do so, the candidate selects two: the most motivating statement by clicking **+** and the least motivating statement by clicking **-**. The third statement is considered as neutral. Each of the 15 factors in **MOTIVATION+** is measured by 8 items. The questionnaire therefore measures 120 motivational components whilst appearing significantly shorter. This item structure also reduces the likelihood of respondent fatigue and response bias. Furthermore, forcing respondents to allocate their preferences to the three options of a question safeguards against impression management and the test-taker's attempts to fake results.

Please indicate what is most important and least important for your motivation at work.

Working with clients.	-	+
Being part of a big team.	-	+
Sharing the values of my company.	-	+

*Figure 1. Example of a Compositional Format Item on **MOTIVATION+**.*

The second part of the questionnaire consists of 1 question with 15 sub-questions that concern the test-taker's satisfaction with their current or previous job. A score of 1 indicates that the test-taker is not at all satisfied with this aspect in his / her job and a score of 10 indicates that the test-taker is very satisfied. Each of the 15 factors measured in **MOTIVATION+** is represented by one global satisfaction question.

How satisfied are you with:

the values shared by the company?

- 1	2	3	4	5
6	7	8	9	10 +

*Figure 2. Example of Satisfaction Scale Items on **MOTIVATION+**.*

Thus, **MOTIVATION+**'s questionnaire structure allows to compare an individual's

motivation with their level of satisfaction. However, it is worthwhile to note that it is possible that an individual who may not be motivated by a certain factor can still be satisfied with the amount or role that this factor plays in their job.

1.3. Mode of Administration, Languages and Special Requirements

MOTIVATION+ is administered online and works with all computer systems including Windows, MAC-OS and Linux. The assessment can be administered remotely and without supervision. A PDF version of the questionnaire is also available, if required. As reports are always generated online, if the test has been administered in paper format, then the scores must manually be entered onto the online platform to generate the candidate reports.

The questionnaire is currently available in English, French and Spanish. For more information on language availability, please contact *Central Tests* Client or Consulting Service (customer@centraltest.com or consulting@centraltest.com).

MOTIVATION+ was designed to be easily used by individuals from diverse backgrounds and for those with a range of special needs. All test-takers are able to adjust visual screen specifications based on individual requirements. Similarly, respondents are able to access test instructions throughout the assessment. It is also possible to navigate through questions or change answers as desired. Alternatively, for blind candidates or those with severe visual disabilities, items may be read aloud by a trained administrator. Individuals with hearing impairments are not excluded from taking the questionnaire, since all content is presented visually.

Although the average time for completion is 15 minutes, **MOTIVATION+** has no set time limit. Therefore, individuals with learning disabilities can take the time they need to complete the assessment. Administrators are thus encouraged to consider whether a test-taker who needed an unusual amount of time to take the assessment may have special needs. Administrators may contact *Central Test* for guidance on administering the questionnaire to individuals or groups with special requirements.

1.4. Social Desirability

Social desirability is the tendency to present oneself in a manner that will be viewed as favourable by others. When done unintentionally, it is referred to as self-deception. When done intentionally, it is referred to as impression management (Tett & Simonet, 2011). As people are social by nature, they are generally inclined to seek some degree of social acceptance. Unlike aptitude tests, the results of questionnaires like **MOTIVATION+** are affected by impression management. An individual's attempt to present himself / herself in a favourable light thus negatively impacts test results, whether the questionnaire is completed online or in paper-based format (Dodou & de Winter, 2014).

MOTIVATION+ actively guards against social desirability with the use of an ipsative (forced

choice) questionnaire format. Research has found ipsative measures to be more resistant to distorted responding compared to more commonly used Likert-scales (Bowen, Martin, & Hunt, 2002; Kluger, Reilly, & Russell, 1991). Not only does the ipsative format reduce the test-taker's ability to inflate their scores, but items are also combined in such a manner that makes it difficult for them to conceive a response strategy, as items are paired with equally appealing response options.

1.5. Test-taker Requirements and Recommendations

MOTIVATION+ was designed for members of the general population, 18 years and older and is suitable for all occupational roles. It is recommended that test-takers receive notification of the objective of the assessment, conditions under which it will be administered, how data will be handled and stored, and the nature of any feedback well in advance. Potential candidates should also be asked to inform the test administrator beforehand of any special needs or requirements.

Previous test-taking experience is not required to take **MOTIVATION+**. Similarly, advanced education and work experience are not requirements to successfully take the assessment.

1.6. Administrator Qualifications and Recommendations

The assessment was developed to be used by human resource (HR) professionals, training and executive development professionals, counsellors and psychologists. To administer **MOTIVATION+**, practitioners must complete standardised training and / or possess accredited testing standards qualifications. Training modules designed by *Central Test* ensure that administrators are able to administer the assessment under standardised conditions; score and norm results; interpret scores and generate written and verbal feedback for a range of organisational needs.

It is recommended that all administrators take **MOTIVATION+**, prior to administering the assessment, making sure to comply with all instructions. This will enable practitioners to become familiar with the assessment and therefore anticipate questions or challenges that may be identified by the test-takers.

Test administration must be in accordance with the organisation's code of practice, as well as legal assessment guidelines on the use of psychometric assessments for employment purposes. All steps must be taken to ensure test administration is objective and fair. Therefore, it is particularly recommended that administrators are aware of international and country laws governing; a) Data Protection, b) Gender Discrimination, c) Age Discrimination, d) Race and Ethnicity Relations, e) Disabilities Discrimination, and f) Religious Discrimination prior to administration.

Additionally, prior to use, administrators must be familiar with *Central Test's* conditions of use and code of ethics and adhere to its quality charter. Administrators must:

- Ensure that the appropriate test has been chosen to meet the specified organisational need
- Make sure that the test-taker is informed about the assessment and its purpose prior to administration.
- Obtain test-taker's consent prior to administration
- Use appropriate norms to interpret results
- Provide the test-taker with feedback on results
- Delete questionnaire results and personal candidate data upon demand
- Treat results and candidate data confidentially and obtain candidate consent before transferring personal data or results to third parties.
- Ensure that only qualified personnel administer assessments and have access to data
- Ensure that test materials and reports are stored in secure environments

For more detailed information about *Central Test's* code of ethics, refer to *Central Test's* quality charter.

1.6.1. Testing Conditions

For best results and candidate experience, **MOTIVATION+** should be administered in a quiet, well-lit and ventilated environment. The test-taker must be informed about the assessment in advance and should have sufficient time to take it. In order to reduce their anxiety, the assessment should be referred to as a questionnaire and not as a test.

For an online administration, it is important that test-takers have comfortable seating, adequate desk space, adequate computer screen size, a keyboard and a mouse. Prior to testing, administrators should ensure that all relevant candidate background information has been collected and verified in order to confirm that the candidate taking the assessment is the right individual.

In cases where individuals take the assessment in the privacy of their home or a convenient location, it is recommended that they do so using a computer they are familiar and comfortable with. For security purposes, all background information and candidate details must be provided to the administrator prior to a candidate taking the assessment. The background information is pre-filled by the test administrator but can be corrected by the candidate after the completion of the assessment, when verifying the 'Additional Information' page post questionnaire completion. Candidates receive notifications to take the questionnaire via email with an embedded web link and login details. Web links to the questionnaire are password-protected and unique to a candidate's account. It is possible to set expiration dates in order to ensure candidates complete the questionnaire within a specified time-frame. For additional security, administrators can also configure the invitation to ensure that the assessment must be completed from the same IP address

once the questionnaire has been accessed.

For monitoring purposes, completion times are recorded to ensure a pleasant test-taking experience. It also allows administrators to see if a candidate rushed through the questionnaire or needed an unusual amount of time to complete the assessment. Test-takers are encouraged to answer questions quickly in order to avoid spending too much time thinking about each statement. It is also recommended that they answer spontaneously as there are no right or wrong answers.

1.6.2. Answering Questions

Although instructions for completing **MOTIVATION+** are presented on-screen, it is important that administrators establish and maintain rapport with candidates. In the case where **MOTIVATION+** is administered offline, instructions should be read aloud by the administrator with candidates given an opportunity to ask questions before taking the assessment. Administrators should also verify that candidates understand what they are required to do prior to starting the assessment session.

Guidelines for a few scenarios:

- If a test-taker does not understand a question, the administrator should answer carefully and avoid explaining the meaning of words or items in his / her own words in order to not lead them toward specific responses.
- If an administrator suspects that a test-taker's lack of understanding is due to language proficiency, the administrator should ask them to take the assessment in the language they are most comfortable with.
- If an administrator suspects that a test-taker's lack of understanding is due to overcautious responding, they should be encouraged to endorse their most likely response.

1.7. Technical and Security Issues

This chapter details guidelines governing the security of administering **MOTIVATION+**. These guidelines ensure that every administration of **MOTIVATION+** is a pleasant, objective and fair process. Security specifications ensure that candidate information is protected both during administration and after assessment completion.

1.7.1. Respecting the Ethical Charter

As a publisher of online assessment tools, *Central Test* respects the legal conventions of French labour law and the regulatory provisions resulting from the law of 6 January 1978 pertaining to information technology, files and freedoms: Declaration N°1834067. Additionally, as of 25th May, 2018, *Central Test* complies with the GDPR (General Data Protection Regulation) made by the European Parliament & Council.

Test results are not to be forwarded to a third person without the explicit consent of the test candidate. As the test-taker has a right to access his / her results, the administrator must grant the test-taker access automatically or when he / she requests it.

The test-taker also has the right to request that all of his / her personal data be permanently deleted. To do this, they must contact either the organisation directly, who will delete his / her data, or *Central Test*.

1.7.2. Confidentiality and Security of User Data

Central Test guarantees the security and confidentiality of data generated during the administration of online tests. Access codes are encrypted in the database and cannot be accessed by anyone. Passwords are computationally generated and are not visible to companies. A URL rewriting module (secure link generator) is installed and has transparent parameter passing for the user.

Browsing and data exchange via the *Central Test* application can be secured and encrypted using SSL. Secure browsing is guaranteed by the https protocol, which is represented by an icon in the form of a padlock in the internet browser. The *Central Test* application has a "GeoTrust SSL True BusinessID" digital signature, issued and certified by GeoTrust®. This certificate is irrefutable evidence of our serious attitude towards security and protects all of *Central Tests* assessments from phishing attacks. Invitations to take tests are made via secured links that are of limited use (in terms of numbers and duration). The tests are timed and IP addresses are tracked. Access to questionnaires may also be limited in terms of numbers and duration.

1.7.3. Hardware Architecture and Server Availability

Central Tests architecture consists of a network of 10 physical dedicated servers providing high-quality service.

Each server is housed in a specialised data centre featuring:

- dedicated lines
- a guaranteed bandwidth of 100Mbps (for each server)
- redundant energy sources
- 4-hour Equipment Restoration Time
- 2-hour Incident Intervention Time
- monitoring and assistance 24/7/365

Access to server administration is restricted by the IP address and is password-secured. Data exchanges are also secure.

The *Central Test* application has been tested using the following browsers:

- Internet Explorer 8 or above
- Firefox 21 or above
- Google Chrome 30 or above
- Safari 7 or above

1.7.4. Computer-generated Reports

Reports can be generated within minutes of candidates completing the questionnaire. The **MOTIVATION+** report is user friendly, customisable and available in several languages. Report content can be tailored depending on the needs of the administrator. Separate reports may also be configured for the candidate and the company, recruiter, coach or psychologist. Reports can also be generated in PDF format.

1.8. Supply, Conditions and Availability

Conditions of supply and availability for **MOTIVATION+** vary from country to country. However, the following points generally apply:

- **MOTIVATION+** is only available for psychologists, HR practitioners and coaches.
- Training is compulsory prior to use and distribution.
- This manual is available to individuals who have been trained to use **MOTIVATION+**.
- **MOTIVATION+** can be ordered online, or by contacting any *Central Test* customer service representative or local partner worldwide (customer@centraltest.com).
- For information on **MOTIVATION+**'s prices and related products and services, contact any *Central Test* customer service representative or local partner worldwide.
- For more information on the training, kindly contact *Central Test's* customer service or one of *Central Test's* partners.

2. Conceptual and Practical Scale Development

MOTIVATION+ was developed using robust theoretical concepts, text analysis of practical and relevant work requirements and advanced scientific analyses. All items in the item bank were piloted and pretested with professionals from multiple continents in order to ensure that the work behaviours assessed were contemporary, global and culture-free.

2.1. Theoretical Background

For over a century, the working world has faced major transformations (Broeck, Vansteenkiste, Witte, Soenens, & Lens, 2010). Closely related to the changing economic market, these changes have been moderated by globalisation, and facilitated by new information and communication technologies (ICT). Technological, economic and social advances have brought forward new challenges to the workplace which highlight the importance of the role of the human being in the work environment, and expose the need to question how performance should be defined in technical and human terms. The post-war period was a turning point for human capital management in modern companies. Production methods were improved to achieve a maximum level of efficiency. From this, work psychology emerged, providing insights on key issues such as decision-making, recruitment, performance evaluation, management of organisations and welfare at work, etc. (Lévy-Leboyer, 2006).

Since the beginning of the twentieth century, economists have tried to answer one specific question: “how are employees motivated?” The first answer to this question established the belief that employees are generally lazy and motivated by monetary incentives. This notion was institutionalised by Frederick Winslow Taylor via his Scientific Management theory, and is now well known as the principle of the “economic man”. However, psychologists quickly realised that the concept of motivation is centred on factors that are much more complex than simple financial rewards, and several experiments have shown that money is not the primary interest of employees.

Over the last few decades, scientists have attended to this matter (G. P. Latham & Budworth, 2006) and proposed various models of motivation. And after seventy years of scientific research, the modern perception of motivation appears to be explained through a complex and multifactorial process. Central to this process are individual characteristics (affect, cognition and social), environmental aspects, and the interaction of these two elements (Lévy-Leboyer, 2006). Motivation is therefore defined as a “physiological and psychological process, responsible for the initiation, maintenance and termination of behaviour and the appetitive or aversive value of the situation in which the specific behaviour occurs” (Bloch et al., 1991). Vallerand and Thill (1993) defined motivation as “the hypothetical construct that describes the internal and/or external forces that produce the initiation, direction, intensity and persistence of behaviour”. Put simply, this definition states that motivation is a hypothetical, and therefore abstract, construct of mental processes which can only be measured indirectly by observing people’s behaviour or behavioural intentions.

The theories of Maslow and Herzberg appear to be the cornerstones of the many theories of motivation proposed during the twentieth century. Despite many limitations to their hypotheses, their approach was hugely popular within human resources, and their names are still present to this day. They claimed that motivation is a process that occurs when a humans act in a specific way to meet their demands. Their great contribution was to then incorporate into their theory, originally considered solely as an exchange system of effort and financial reward, a spiritual dimension (Lévy-Leboyer, 2006). The stage of the "economic man" was then followed by the stage of the "social man," or in other words the "human relations movement," which has its roots in the work of Elton Mayo and the discovery of the Hawthorne effect. Mayo discovered that the performance of workers can be improved simply by observing them, through their awareness of this observation. (Mayo, 1949). This work helped to initiate a wide range of research in the social psychology field. Thus, motivation became a multi-dimensional concept, addressed through human needs, personality traits, context, human-environment suitability, cognition affects and emotions (Latham & Pinder, 2005).

Nowadays, because of the evolution of research on motivation, Lévy-Leboyer (2006) emphasises that: "the language itself has changed: we no longer talk of "needs" but rather values and patterns." (P. 35). The central challenge for organizations is to know and understand the priorities set by stakeholders, in order to construct a company policy based on the hierarchy of values (Lévy-Leboyer, 2006). But what exactly are values? According to Bilsky & Schwartz (1994), values are commonly composed of five basic characteristics: they are concepts or beliefs, refer to desired behaviours or conditions, are not confined to a particular situation, serve as a guideline in the selection or evaluation of behaviour and events, and are classified according to the relative importance that we give them. Similarly, these characteristics may apply to a particular context, for example, "work values" is an expression for general values in a work context (Ros, Schwartz & Surkiss, 1999). It is necessary to differentiate values from attitudes; an attitude is limited to a factor such as a person, location or event, while values, in contrast, are more general and more entrenched. It is thought that values are developed through social interactions, and may be passed culturally through generations. Theories also suggest that in early developmental stages, individuals begin with a wide pool of values, but over time these become refined and individuals learn to direct their behaviour based on the values they prioritise the most. Now that the concept of values has been explored, it is necessary to establish the link between work values and motivation.

Note that in the literature the terms "needs", "motives" and "values" are often used as synonyms, but 'values' can be considered an approach to motivation in themselves, specifically as secondary engines that drive actions determined by needs, socialisation, cognition and experience (Deci & Ryan, 2000; Kooij, De Lange, Jansen, Kanfer & Dikkers, 2011; Krumm, Grube & Hertel, 2013). Values are therefore rooted in needs, with the main difference being that needs are innate, while values are acquired through cognition and experience. They are indirectly included in most theories (Latham & Pinder, 2005), and can be divided into two areas; *principles* (involving an idea of how behaviour should be) and *preferences* (expressing cravings and/or a hierarchy of values) (Parks & Guay, 2009). Schwartz (2006) argues that values have played a central role in various social science

disciplines, including psychology. They can be used to characterise individuals or companies, measure changes across a time axis, and explain behaviours and attitudes.

In addition, personal goals serve as a mediator between values and behaviour, in the sense that values influence the formation of goals, which then lead to certain behavioural choices (Kanfer, 1990). However, Parks & Guay (2009) raise a fundamental issue concerning the measurement of this concept; studies have not been able to empirically identify the link between motivation and values. However, many studies show that values are involved in decision-making processes, the pursuit of goals and are above all influential on the behaviour of individuals.

Based on these explanations, we can still assume that values adequately meet the definition of motivation, as (a) they are primarily a hypothetical construct, (b) they describe the internal or external forces behind action, and (c) they allow a global definition of the initiation, direction, intensity and persistence of behaviour. For example: "status" is a hypothetical construct (i.e. an abstract notion) that comes from an external force (i.e. social recognition) and that will determine the behaviour of the individual who attaches great importance to this value.

Further proof for these assumptions has been found during questionnaire validation studies. Research suggests that performance at work has a higher correlation with motivation that stems from values rather than motivation that stems directly from the task itself (Gagné et al, 2015; Gagne and Deci, 2005).

The theory of basic human values proposed by Schwartz (1992, 1994) contains 10 universal values which differ in terms of motivation. These may be opposite or complementary and can be organised into four higher-order groups. Schwartz (2006) describes six key features that all values have in common:

- "Values are beliefs"
- "Values refer to desirable goals"
- "Values guide the selection of actions, people or events"
- "Values are used as standard or criteria"
- "Values are ordered by importance"
- "The relative importance of multiple values guides action"

The distinction between them is therefore based on the different types of induced motivation. However, this universal model is not specifically designed for the working environment.

The work of Ros et al. (1999) was the first empirical attempt to understand the link between values and attitudes, or behaviour, and to apply the basic human values to the workplace. His pioneering research has many advantages, including the multicultural character of the theory and the importance of distinguishing several general values.

Since the publication of this study by Ros et al., over a decade of research has focused on values at work. In 2013, the "Munster Work Value Measure (MWVM)" emerged (Krumm et al., 2013), based on the inventory of values by Schwartz (1992, 1994), which brings together 56 motivational values, represented in a circumplex model and ordered by four meta-values. The MWVN is similar to the basic human values of Schwartz, introducing 21 values ordered by five meta-values. They are also represented in a circumplex and are titled "*Intrinsic Growth Values*"; "*Affective Values*"; "*Generativity Values*"; "*Context-related Values*"; and "*Extrinsic Growth Values*". The Intrinsic Growth Values encompass values that achieve personal fulfillment through work itself, such as "learning", "autonomy" and "achievements". Affective Values refer to emotions and feelings that can be experienced at work, for example, values like "enjoyment" or "appreciation". Context-related Values refer to elements around work with values such as "security" or "health". Extrinsic Growth Values refer to the acquisition of resources related to success at work and are composed of values such as "money", "status" or "influence". Finally, Generativity Values refer to all social values that have a concept of transmission and mutual assistance, such as "generativity", "helping" or "legacy". Many studies have shown in the past that a distinction between intrinsic and extrinsic motivation is relevant, and the four-factor model of Schwartz has been replicated many times. The MWVM is an extension of this structure, adding the concept of generativity, defined as a measure of sensitivity by age. (Krumm et al., 2013; Ros et al., 1999; Schwartz, 1992, 1994).

The model of **MOTIVATION+** utilises Schwartz's four-dimensional work value structure - measuring the four work values *Self-Advancement*, *Internal*, *External* and *Social* - as a theoretical framework to categorise the 15 factors measured in **MOTIVATION+** into three motivational value groups - ***Social Motivators***, ***Personal-development Motivators*** and ***Contextual Motivators***. This categorisation into the three groups facilitates ease in understanding the 15 motivational factors that encompass **MOTIVATION+**. Figure 3 shows the model of **MOTIVATION+** with its 3 motivational value groups and 15 factors.

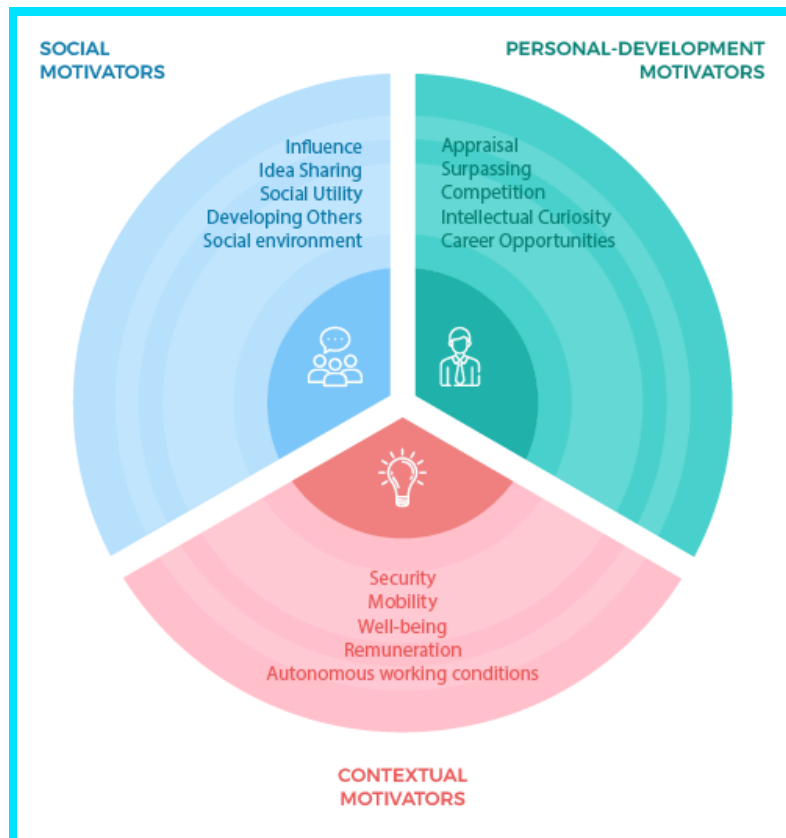


Figure 3. Model of MOTIVATION+.

Below is a table showing the mapping of **MOTIVATION+**'s factors with the work values measured in the MWVM.

Table 1. Comparison Between the Factors of MOTIVATION+ and the MWVM.

MOTIVATION+ Factors	MWVM Work Values
Autonomous Working Conditions	Autonomy
Competition	Influence
Career Opportunities	Advancement
Intellectual Curiosity	Learning
Surpassing	Learning, Generativity
Idea-Sharing	Helping
Well-Being	Health
Influence	Autonomy
Remuneration	Money

Mobility	Legacy
Security	Security
Social Environment	Social Contact
Social Utility	Helping
Developing Others	Generativity
Appraisal	Appreciation

Age

Values are particularly interesting when measuring motivation because they are relatively stable over time. They may change under special circumstances, for reasons such as the desire to maintain a good image of oneself, the entry into the world of work or a workplace change. Furthermore, there are certain changes in the evolution of values throughout the lifespan of a person. For example, the older one gets, the greater importance given to targets with an emotional component rather than future-oriented goals. This reversal can be explained by a change in the temporal perception of individuals.

Literature states that there are several tools which indirectly measure the differences between individuals based on age. These differences may be relevant for certain companies, and especially career management services (Krumm et al., 2013). For example, generativity values should be of greater importance for people who have advanced in their careers (values such as legacy and social utility), while on the contrary, those at the start of their career will emphasise extrinsic-growth values (such as status and career development opportunities) (Schwartz, 2006).

Gender

Besides age, there are also gender differences in the motivation theories discussed in the literature. Indeed, Schwartz and Rubel (2005) pointed out that many studies deal with a difference between men and women regarding the importance attached to certain values. The research suggests that these differences do exist, even if they are small. For example, men are more likely to have values that refer to action (such as influence or power), whereas women are oriented more towards social values (such as benevolence and universalism) (Schwartz, 2006). A small number of studies have shown that there is even a difference between men and women concerning work values. Specifically, it was shown that women consider social values as more important (e.g. helping others) while men give more importance to extrinsic values (e.g. advancement) (Schwartz & Rubel, 2005).

2.2. Development of MOTIVATION+

MOTIVATION+ was developed via a thorough, multistage process in a comprehensive and scientific manner. The development of the test started in 2016, as a result of accrued demand from companies using psychometric assessments in order to provide a “supplementary aid” in HR processes. Extensive empirical and theoretical research was conducted to create the groups, factors and items of **MOTIVATION+**. The questionnaire was also pretested several times to ensure that it met the criteria for reliability and validity that is established by internationally recognised psychological institutions. Special attention was also given to guard against social desirability as well as to simplify the ergonomics of the assessment.

2.2.1. Groups, Factors and Item Construction

MOTIVATION+ is a complete and comprehensive revision of *Central Test's* motivational assessment, *PRISM ©*, which exists only in French. **MOTIVATION+** is a result of a review of *PRISM's* theoretical background, question format, and item bank, to match contemporary literature on the subject of work motivation. **MOTIVATION+** measures 15 motivational factors (detailed in chapter 1). These factors are grouped into three work value dimensions; *Social Motivators*, *Personal-development Motivators* and *Contextual Motivators*.

Multiple reviews were conducted to ensure that the factors are clearly defined, and that items targeting each factor accurately reflect modern and business-relevant behaviours, thus resulting in the following:

1. Greater differentiation between each motivation-based factor
2. Inclusion of factors that target occupational and organisational fit
3. Clearer item structure and wording
4. Updated use of terms and relevance of items to match the current working world
5. Simple and easily comprehensible use of language

Thus, items for **MOTIVATION+** were written to promote ease of response as well as facilitate candidates' mental connection and understanding of it. As the questionnaire aimed to capture work behaviours in multiple contexts, items were checked for cultural bias, clarity, offensiveness and language accuracy.

2.2.2. Ipsative Response Format

Response items for the 40 core questions of **MOTIVATION+** are written in an ipsative (forced-choice) format. This means that respondents choose between descriptors according to their preference (in this case, choosing a descriptor which captures their preference most, and which captures their preference least).

Ipsative formats have been found to reduce response bias (Chan, 2003; Saville & Willson,

1991; Ten Holt, van Duijn & Boomsma, 2010). The fact that respondents cannot endorse all items eliminates acquiescence (the tendency to agree with all items on a questionnaire), reduces susceptibility to impression management and means that it is generally more difficult to fake (Brown & Maydeu-Olivares, 2011a). Ipsative formats make it impossible to provide the same response on all items, thereby resulting in greater differentiation of scores within a profile.

2.2.3. Satisfaction Scale's Likert Format

Question 41 requires the candidate to indicate their level of satisfaction of work, on each of the 15 factors measured in **MOTIVATION+**. This is presented as fifteen likert scale questions, one for each factor, ranging from scores of 1 to 10. A score of 1 means not at all satisfied,' a score of 5 means 'neither satisfied nor dissatisfied,' and a score of 10 means 'very satisfied.'

2.2.4. Pre-tests and Pilot Study

MOTIVATION+ was constructed in a manner that ensured items were culturally equivalent from the early stages of development, rather than focusing on the cultural adaption after the questionnaire validity had been established within a single context – the typical practice of test developers.

Pre-tests were conducted with a range of male and female professionals across the globe to ensure that items were accurate, relevant, clear, concise, culture-free, bias-free and that they reflected targeted work behaviours. After four pretests and a pilot, the final questionnaire was validated with a sample of 915 English-speaking professionals from various countries. The sample consisted of English speakers from different continents in order to establish the questionnaire as an international measure of motivation at work.

3. Scoring

A raw score is the total number of responses endorsed by a candidate for each factor measured. In the context of an occupational motivation assessment, raw scores mean little as they do not provide effective or appropriate comparisons between candidates across a specific motivator. Norms enable Human Resource practitioners, managers and recruiters to evaluate an individual's score relative to the score of other delegates who have completed the same assessment.

3.1. The Relationship between Raw Scores and Norms

The best norm group is one that is most representative of the characteristics of the individuals taking a test. Applied assessment assumes personality traits, interests, motivations, values, attitudes and perceptions are distributed along a normal probability or bell-shaped curve. Therefore, norm groups effectively identify individual scores across this distribution. In any given population, levels of a target attribute may be found. Therefore, for a given attribute or trait, the normal curve represents the norm or average performance of a population and the scores that are above and below the average for that population (Kaplan & Saccuzzo, 2008). For norms to be meaningful, the sample used must reflect the intended population of test-takers. If a test is developed for engineers, the norm sample must consist of engineers in the population. Similarly, if an assessment was developed for nurses, it is not appropriate for use in the selection of chemists. Norm groups can range in size from a few hundred to a hundred thousand. However, the larger the norm group sample size, the closer the approximation to a normal population distribution. Figure 4 shows the normal bell curve.

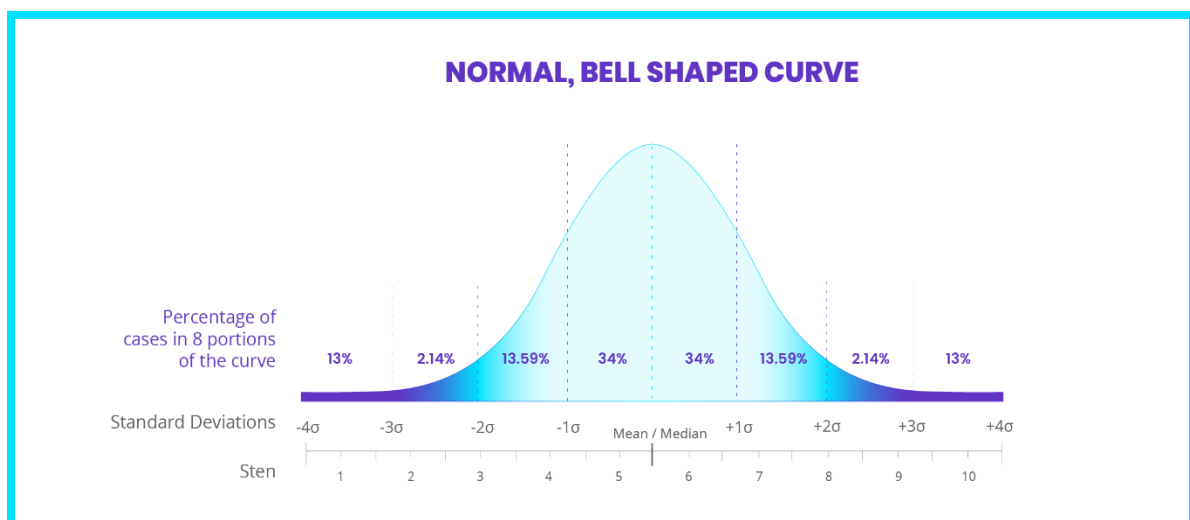


Figure 4. Normal Bell-shaped Curve Showing the Distribution of Percentages, Standard Deviations and Standard Ten (Sten).

Key to the creation of norms is the conversion of raw scores into derived scores. This process provides a system of common metrics that readily facilitates the interpretation of test scores. For **MOTIVATION+**, the forms of score standardization used were: 1) Mean; 2) Median; 3) Standard deviation; 4) Standard score; 5) Standard ten (sten); and 6) Standard error of measurement. Table 2 describes the various types of derived scores used in the validation of **MOTIVATION+**.

Table 2. Types of Derived Scores used to Standardise MOTIVATION+.

Sr. No.	Derived Score	Symbol	Definition and Characteristics
1	Mean	μ	Mean is the average score of all participants who complete an assessment. The mean is calculated by dividing the sum of all scores by the number of participants. The formula for calculating the Mean is: $\mu = (\Sigma X) / N,$ where ΣX is the sum of all the population observations, and N is the number of population observations.
2	Median	$\tilde{x}$	Median is the score that separates the highest scores from the lowest scores in equal numbers. The observed values are first ranked in ascending order. The median is then the value that divides the study population into two subsets of equal size (if the number of observations n is even, the median is the half-sum of the rank terms n and n + 1). Like Mean, Median is a measure of the general tendency of a group of scores.
3	Standard Deviation	σ	Standard Deviation is a measure of the amount of variation across scores for candidates who take an assessment. A small standard deviation indicates scores are close to the mean, while a large value tells us there is much variability across individuals. The formula for calculating Standard Deviation is: $\sigma = \sqrt{\Sigma (X_i - \mu)^2 / N},$ where μ is the population mean, X_i is the ith element from the population, and N is the number of elements in the population.

4	Standard Score	<i>Z</i>	Standard Score is an estimate of whether an individual's score is above average, average or below average compared to peers. Scored on a scale from -4 to 4 with zero in the middle representing average. Positive scores are above average while negative scores are below average. Z scores are calculated using the formula: $z = (x - \mu) / \sigma$ where x is a normal random variable, μ is the mean of x, and σ is the standard deviation of x.
5	Standard Ten	<i>Sten</i>	For a Standard Score with scores ranging from 1 – 10, here Mean is 5.5 and Standard Deviation equals 2. The formula for calculating Sten Score is: $\text{Sten} = (X - \mu) / \sigma + 5.5$ where X is the candidate's raw score, μ is the mean of raw scores for all candidates, σ is the standard deviation of raw scores on the standardisation sample, multiplied by 2 + 5.5. Sten Scores are rounded to the nearest whole number with values less than 1 or greater than 10 rounded up or down respectively.
6	Standard Error of Measurement	<i>SEM</i>	SEM is related to test reliability and provides an indication of the dispersion of measurement errors associated with test scores from a group of candidates. It helps us to identify the level of errors when estimating a candidate's true scores from their observed scores. The smaller the SEM, the more accurate are the assessments that are being made. The formula for calculating SEM is: $\text{SEM} = \sigma \sqrt{1 - \text{reliability}}$

3.2. Transforming Raw Scores into Standardised Scores

The 40 questions that measure an individual's motivational values are transformed from raw scores to standardised scores as each value is measured by 8 items. For the 120 components/items measuring motivation, the minimum and maximum overall score for

each attribute is 0 and 10. For the satisfaction score, the report reflects the score that was chosen by the participant on the scale from 0 to 10 for each of the 15 areas.

The conversion of raw scores to standardised scores is achieved using a four-step process, as below.

Step 1 Ipsative scores are calculated for each scale by summing all forced-choice responses for each attribute. For each item, 1 is assigned to the endorsed response which is the most preferred, 0 for the response that is not endorsed & -1 to the endorsed response which is the least preferred.

Step 2 Scores are repositioned on a scale from 0 to 10 by using the following formula:

$$score = \left(\frac{\text{raw score} - (\text{min})}{(\text{max}) - (\text{min})} \right) * 10$$

Whereby max refers to the maximum possible score of each scale and min refers to the minimum possible score of each scale.

Step 3 To enable the comparisons between individuals, scores for each scale are standardised using the mean and standard deviation across respondents. This process produces a z score using the formula:

$$z = (score - (\mu/\sigma))$$

Step 4 Standardised scores are then transformed into sten scores from 1 to 10 using the formula:

$$sten = z * 2 + 5.5$$

3.3. Standard Error of Measurement

As no test score is perfect, an estimation of the possible amount of error present within a score is required. This amount of error associated with a score is known as the standard error of measurement (SEM). SEM helps to understand what is a candidate's true score and the extent to which it differs from the obtained score (Harvill, 1991). In an ideal world, SEM would be calculated by having an individual take an assessment on many occasions over a long period of time. The extent to which there is variation across each score obtained by the candidate would be classified as the standard error of measurement. However, as it is not feasible to assess candidates multiple times, SEM must be calculated using a different approach via the formula as stated below.

$$SEM = S \sqrt{1 - r_{xx}}$$

where,

r_{xx} is the reliability of the test, or the reliability of a factor measured in the test
S is the standard deviation

For the factor *Idea Sharing* in **MOTIVATION+**, $SEM = 1.84 * (\sqrt{1 - 0.78})$ i.e. 0.86.

SEM is usually accompanied by a confidence interval (CI), or a range around the estimated “true” score. From this confidence band, we are able to determine the extent to which a score may vary. However, it is important to note that SEM is related to reliability. Therefore, as reliability increases, SEM decreases. Below are some common SEM confidence intervals and their formulas:

68% CI = Score $\pm$ SEM

95% CI = Score $\pm$ (1.96 * SEM)

99% CI = Score $\pm$ (2.58 * SEM)

Thus, at a 95% confidence interval, the factor *Idea Sharing* with an obtained score of 6 and SEM of 1.59, has a confidence band of 4.31 to 7.69. This means we can be 95% confident that an individual's true score lies in this range.

3.4. Choosing an Appropriate Norm Group

Norms make it possible to give meaning to an individual's score. The interpretation of the same score may therefore differ depending on individual differences, such as study level. For accurate interpretation, it is necessary to compare an individual's score with a group that is most similar to him/her. To choose the appropriate norm, first identify the country of the candidate. Then from that country, identify the age, gender, level of education, number of years' work experience, socio-professional status, industry or occupational group that is most appropriate for the candidate. Alternatively, it is possible to create your own internal norms, based on the candidates that have already been assessed.

3.5. Creating In-house Norms

It is possible to generate internal organisational norms if there is a relevant sample of 100 or more individuals. In-house norms ensure that comparisons between individuals and the reference group reflect the target role, tasks and work environment as closely as possible. In-house norms are particularly valuable in situations where standard norms are not available, roles are new, the organisation has a unique client base or business function, and in cases where the applicant pool for a role is significantly higher or lower than expected.

To create in-house norms, first calculate the mean and standard deviation for each factor on **MOTIVATION+** and score the results based on the step-by-step guide outlined in Chapter 3.2. Organisations will then be able to compare individual applicants or employees to a local normal group.

3.6. Link between Scores and Report Content

Personalised Motivation Comments

Comments on the **MOTIVATION+** report reflect the scoring process. An individual receives a score of 0 to 10 (as demonstrated in Chapter 3.2.). The comments provide an extensive interpretation of all the factors that are within the three work value groups of the test. They are chosen from six levels according to the score of the candidate, and detail the individual's motivations according to his/her score. Higher scores are accompanied by stronger descriptors, weaker scores are accompanied by weaker descriptors, and so on. For example, a candidate with a low score on a factor may be described as 'not appearing to be motivated' by the relevant factor. A high score on the other hand may describe an individual as being 'highly motivated' by the relevant factor. It is important to note that scores should be interpreted in relative terms as the order of the targeted factors is more important than their absolute score.

Personalised Satisfaction and Advice Comments

For each **MOTIVATION+** factor, the report also provides an interpretation of the candidate's current satisfaction level with each factor in their current or most recent role, based on their responses to the satisfaction questions within the questionnaire. The satisfaction comments are chosen from three levels according to the candidate's score (between 0 to 10). The level of strength and detail within the satisfaction comments corresponds to the combined motivation and satisfaction scores for each factor. In instances where motivation factor scores are high but satisfaction scores are low, additional advice comments indicate actions the candidate could take in order to improve their level of satisfaction. No advice comment will be shown when satisfaction scores are low and motivation factor scores are also low, as the candidate's responses indicate that this is not a significant motivator for them, so increasing their level of satisfaction in these areas is not relevant.

4. Sample Descriptives

The final sample used to validate **MOTIVATION+** consisted of 864 participants (465 females and 399 males), from a large range of occupational groups. Data was collected from the internet crowdsourcing marketplace, *Amazon Mechanical Turk*, the Research and Innovation Testing Centre of *Central Test*, as well as HR / Client data in order to ensure that the reported data is objective, non-discriminatory and relevant to the intended population.

Tables 3 to 6 provide an overview of the sample descriptives.

Table 3. Descriptives Based on Gender.

Gender	N	Percentage (%)
Females	465	53.82
Males	399	46.18

Table 4. Descriptives Based on Age Group.

Age Group	N	Percentage (%)
18 - 25	158	18.29
26 - 33	262	30.32
34 - 41	211	24.42
42 - 49	102	11.81
50-56	76	8.80
57 and above	55	6.37

Table 5. Descriptives Based on Study Level.

Study Level	N	Percentage (%)
Level 1: Master's Degree, PhD, Engineering or Business School, MBA	208	24.07
Level 2: Bachelor's Degree, First-year Masters	384	44.44
Level 3: 2 years of Vocational or University Studies	141	16.32
Level 4: High School Diploma	93	10.76
Level 5: Trades Training, No High School Diploma	15	1.74
Student	12	1.39
Not Defined	11	1.27

Table 6. Descriptives Based on Country of Origin.

Country of Origin	N	Percentage (%)
USA	493	57.06
India	205	23.73
Other	166	19.21

Note: Countries of Origin in the "Other" category have been grouped together as so as they correspond to a number that is not sufficient to be represented. The countries grouped as so are: Algeria, Argentina, Australia, Bahrain, Bangladesh, Belgium, Botswana, Brazil, Bulgaria, Canada, Colombia, Costa Rica, Cyprus, Denmark, Ecuador, Estonia, France, Georgia, Germany, Greece, Indonesia, Ireland, Italy, Jamaica, Kenya, Lebanon, Macedonia, Mauritius, Mexico, Mongolia, Netherlands, Nigeria, Oman, Pakistan, Philippines, Portugal, Romania, Saudi Arabia, Senegal, Singapore, South Africa, Spain, Sweden, Switzerland, Tanzania, Tunisia, Turkey, Uganda, United Arab Emirates, United Kingdom and Zimbabwe.

5. Norms

Norms provide information that allow comparisons to be made between individual candidate scores and the scores of a particular reference group.

Norms are standardised scores. Scores on psychological tests like **MOTIVATION+** are most commonly interpreted by reference to the norm group scores.

There are two purposes of norms:

1. Norms indicate an individual's relative standing in the normative sample to allow the evaluation of his/her performance in relation to others.
2. Norms provide compared measures that enable a direct comparison of an individual's performance on a difference test (Anastasi, 1982).

Tables 7 to 11 detail the mean, standard deviation, median, minimum, maximum, range and standard estimate scores for the English-speaking sample on factors of **MOTIVATION+**. These tables are based on gender, age group, study level and country of origin.

Table 7. Motivation Score Norms for the Whole Sample.

Factor	Mean	SD	Median	Min	Max	Range	SE
Idea Sharing	5.06	1.88	5.00	0.00	10.00	10.00	0.06
Intellectual Curiosity	5.54	1.84	5.60	0.60	10.00	9.40	0.06
Surpassing	4.42	1.95	4.40	0.00	10.00	10.00	0.07
Remuneration	5.62	2.58	5.60	0.00	10.00	10.00	0.09
Influence	5.32	2.13	5.00	0.00	10.00	10.00	0.07
Feedback	3.91	2.02	3.80	0.00	10.00	10.00	0.07
Competition	2.86	2.16	2.50	0.00	9.40	9.40	0.07

Career Opportunities	6.59	2.01	6.90	0.00	10.00	10.00	0.07
Mobility	3.38	2.19	3.10	0.00	10.00	10.00	0.07
Autonomous Working Conditions	6.13	2.2	6.30	0.00	10.00	10.00	0.07
Well-being	4.53	2.07	4.40	0.00	10.00	10.00	0.07
Security	5.81	2.43	5.60	0.00	10.00	10.00	0.08
Developing Others	4.54	1.91	4.40	0.00	10.00	10.00	0.06
Social Utility	5.70	2.25	5.60	0.00	10.00	10.00	0.08
Social Environment	5.77	1.92	5.60	0.00	10.00	10.00	0.07

Table 8. Motivation Score Norms Based on Gender.

Factor	Mean	SD	Median	Min	Max	Range	SE
<i>Females</i>							
Idea Sharing	5.04	1.87	5.00	0.00	10.00	10.00	0.09
Intellectual Curiosity	5.45	1.84	5.60	0.60	10.00	9.40	0.09
Surpassing	4.34	1.96	4.40	0.00	9.40	9.40	0.09
Remuneration	5.74	2.62	5.60	0.00	10.00	10.00	0.12
Influence	5.20	2.14	5.00	0.00	10.00	10.00	0.10

Feedback	3.90	2.08	3.80	0.00	9.40	9.40	0.10
Competition	2.65	2.25	2.50	0.00	9.40	9.40	0.10
Career Opportunities	6.72	1.98	6.90	0.60	10.00	9.40	0.09
Mobility	3.36	2.23	3.10	0.00	10.00	10.00	0.10
Autonomous Working Conditions	6.19	2.19	6.30	0.00	10.00	10.00	0.10
Well-being	4.42	2.13	4.40	0.00	10.00	10.00	0.10
Security	5.95	2.38	5.60	0.00	10.00	10.00	0.11
Developing Others	4.45	1.86	4.40	0.00	9.40	9.40	0.09
Social Utility	5.91	2.29	5.60	0.60	10.00	9.40	0.11
Social Environment	5.87	1.95	5.60	0.60	10.00	9.40	0.09

Factor	Mean	SD	Median	Min	Max	Range	SE
--------	------	----	--------	-----	-----	-------	----

Males

Idea Sharing	5.08	1.91	5.00	1.30	10.00	8.70	0.10
Intellectual Curiosity	5.66	1.83	5.60	0.60	10.00	9.40	0.09
Surpassing	4.52	1.92	4.40	0.00	10.00	10.00	0.10

Remuneration	5.49	2.53	5.60	0.00	10.00	10.00	0.13
Influence	5.45	2.13	5.60	0.00	10.00	10.00	0.11
Feedback	3.93	1.95	3.80	0.00	10.00	10.00	0.10
Competition	3.10	2.03	3.10	0.00	9.40	9.40	0.10
Career Opportunities	6.44	2.05	6.30	0.00	10.00	10.00	0.10
Mobility	3.39	2.15	3.10	0.00	10.00	10.00	0.11
Autonomous Working Conditions	6.06	2.21	5.60	0.00	10.00	10.00	0.11
Well-being	4.65	1.98	4.40	0.00	10.00	10.00	0.10
Security	5.64	2.48	5.60	0.00	10.00	10.00	0.12
Developing Others	4.65	1.97	4.40	0.00	10.00	10.00	0.10
Social Utility	5.47	2.19	5.60	0.00	10.00	10.00	0.11
Social Environment	5.66	1.89	5.60	0.00	10.00	10.00	0.09

Table 9. Motivation Score Norms Based on Age Groups.

Factor	Mean	SD	Median	Min	Max	Range	SE
18 - 25							
Idea Sharing	5.17	1.89	5.00	1.90	10.00	8.10	0.15

Intellectual Curiosity	5.39	1.79	5.60	0.60	10.00	9.40	0.14
Surpassing	4.95	1.92	5.00	0.60	9.40	8.80	0.15
Remuneration	5.06	2.32	5.00	0.00	10.00	10.00	0.18
Influence	4.97	1.90	5.00	0.60	10.00	9.40	0.15
Feedback	4.34	1.96	4.40	0.00	9.40	9.40	0.16
Competition	3.71	2.10	3.80	0.00	8.10	8.10	0.17
Career Opportunities	6.28	1.93	6.30	1.90	10.00	8.10	0.15
Mobility	3.85	1.98	3.80	0.00	8.80	8.80	0.16
Autonomous Working Conditions	5.46	2.15	5.60	0.00	10.00	10.00	0.17
Well-being	4.97	1.80	5.00	1.30	10.00	8.70	0.14
Security	5.05	1.98	5.00	0.00	9.40	9.40	0.16
Developing Others	4.88	1.95	5.00	0.60	9.40	8.80	0.15
Social Utility	5.43	2.05	5.00	1.30	10.00	8.70	0.16
Social Environment	5.66	1.68	5.60	0.00	9.40	9.40	0.13

Factor	Mean	SD	Median	Min	Max	Range	SE
--------	------	----	--------	-----	-----	-------	----

26 - 33

Idea Sharing	4.90	1.86	5.00	0.60	9.40	8.80	0.12
Intellectual Curiosity	5.72	1.77	5.60	0.60	10.00	9.40	0.11
Surpassing	4.50	1.76	4.40	0.00	10.00	10.00	0.11
Remuneration	5.76	2.29	5.60	0.00	10.00	10.00	0.14
Influence	5.18	2.07	5.00	0.60	10.00	9.40	0.13
Feedback	4.14	1.95	3.80	0.00	10.00	10.00	0.12
Competition	3.24	2.02	3.10	0.00	9.40	9.40	0.13
Career Opportunities	6.57	1.87	6.90	0.00	10.00	10.00	0.12
Mobility	3.55	2.05	3.80	0.00	9.40	9.40	0.13
Autonomous Working Conditions	5.72	2.03	5.60	0.60	10.00	9.40	0.13
Well-being	4.76	1.88	4.40	0.00	10.00	10.00	0.12
Security	5.67	2.27	5.60	0.00	10.00	10.00	0.14
Developing Others	4.43	1.87	4.40	0.00	8.80	8.80	0.12
Social Utility	5.58	2.08	5.60	0.00	10.00	10.00	0.13
Social Environment	5.48	1.92	5.60	0.00	9.40	9.40	0.12
Factor	Mean	SD	Median	Min	Max	Range	SE

34 - 41

Idea Sharing	4.94	1.87	5.00	0.00	10.00	10.00	0.13
Intellectual Curiosity	5.33	1.76	5.00	1.30	10.00	8.70	0.12
Surpassing	4.00	2.01	3.80	0.00	8.80	8.80	0.14
Remuneration	6.10	2.70	6.30	0.00	10.00	10.00	0.19
Influence	5.45	2.21	5.60	0.00	10.00	10.00	0.15
Feedback	3.65	2.13	3.10	0.00	8.80	8.80	0.15
Competition	2.51	2.04	1.90	0.00	9.40	9.40	0.14
Career Opportunities	6.95	2.04	7.50	0.60	10.00	9.40	0.14
Mobility	3.05	2.26	2.50	0.00	9.40	9.40	0.16
Autonomous Working Conditions	6.48	2.22	6.90	0.60	10.00	9.40	0.15
Well-being	4.44	2.25	4.40	0.00	10.00	10.00	0.16
Security	6.38	2.47	6.90	0.00	10.00	10.00	0.17
Developing Others	4.37	1.88	4.40	0.00	10.00	10.00	0.13
Social Utility	5.69	2.35	5.60	0.60	10.00	9.40	0.16
Social Environment	5.81	1.96	5.60	0.60	10.00	9.40	0.13

Factor	Mean	SD	Median	Min	Max	Range	SE
<i>42 - 49</i>							
Idea Sharing	5.00	1.90	5.00	0.00	9.40	9.40	0.19
Intellectual Curiosity	5.55	1.97	5.00	1.30	10.00	8.70	0.20
Surpassing	4.55	1.90	4.40	0.60	9.40	8.80	0.19
Remuneration	5.56	2.84	5.60	0.60	10.00	10.00	0.28
Influence	5.37	1.85	5.60	1.30	10.00	8.70	0.18
Feedback	3.80	2.08	3.80	0.00	8.10	8.10	0.21
Competition	2.33	2.07	1.90	0.00	8.80	8.80	0.20
Career Opportunities	7.06	1.84	6.90	1.90	10.00	8.10	0.18
Mobility	2.87	2.28	2.50	0.00	10.00	10.00	0.23
Autonomous Working Conditions	6.24	2.18	6.30	1.30	10.00	8.70	0.22
Well-being	4.14	2.05	4.40	0.00	10.00	10.00	0.20
Security	6.31	2.56	6.90	0.00	10.00	10.00	0.25
Developing Others	4.50	1.88	4.40	0.00	8.80	8.80	0.19
Social Utility	5.86	2.50	5.60	0.60	10.00	9.40	0.25
Social Environment	6.08	2.09	6.30	1.30	10.00	8.70	0.21

Factor	Mean	SD	Median	Min	Max	Range	SE
<i>50 - 56</i>							
Idea Sharing	5.26	1.94	5.30	0.60	9.40	8.80	0.22
Intellectual Curiosity	5.58	1.94	5.60	1.90	9.40	7.50	0.22
Surpassing	4.27	2.05	4.10	0.00	9.40	9.40	0.24
Remuneration	5.44	3.07	5.60	0.00	10.00	10.00	0.35
Influence	5.71	2.47	5.60	1.30	10.00	8.70	0.28
Feedback	3.66	1.96	3.80	0.60	9.40	8.80	0.23
Competition	1.93	2.18	1.30	0.00	9.40	9.40	0.25
Career Opportunities	6.32	2.26	6.30	0.60	10.00	9.40	0.26
Mobility	3.27	2.30	2.80	0.00	10.00	10.00	0.26
Autonomous Working Conditions	7.07	2.12	7.50	0.00	10.00	10.00	0.24
Well-being	4.07	2.33	4.40	0.00	9.40	9.40	0.27
Security	5.86	2.82	6.30	0.60	10.00	9.40	0.32
Developing Others	4.85	2.17	5.00	0.60	9.40	8.80	0.25
Social Utility	5.99	2.36	6.30	1.30	10.00	8.70	0.27

Social Environment	5.91	2.07	5.60	1.30	10.00	8.70	0.24
Factor	Mean	SD	Median	Min	Max	Range	SE
<i>57 and above</i>							
Idea Sharing	5.75	1.80	6.30	1.90	10.00	8.10	0.24
Intellectual Curiosity	5.89	2.06	6.30	0.60	9.40	7.50	0.28
Surpassing	4.13	2.21	4.40	0.00	8.80	8.80	0.30
Remuneration	5.16	2.60	5.00	0.00	10.00	10.00	0.35
Influence	5.74	2.61	5.60	0.60	10.00	9.40	0.35
Feedback	3.17	1.74	3.10	0.60	8.10	7.50	0.23
Competition	2.14	2.39	1.30	0.00	9.40	9.40	0.32
Career Opportunities	5.71	2.35	5.60	0.60	10.00	9.40	0.32
Mobility	3.57	2.53	3.10	0.00	10.00	10.00	0.34
Autonomous Working Conditions	7.16	2.11	6.90	2.50	10.00	7.50	0.28
Well-being	3.82	2.14	3.80	0.00	8.80	8.80	0.29
Security	5.45	2.74	5.00	0.00	10.00	10.00	0.37

Developing Others	4.45	1.67	4.40	1.30	8.80	7.50	0.23
Social Utility	6.46	2.39	6.90	0.60	10.00	9.40	0.32
Social Environment	6.59	1.67	6.90	2.50	10.00	7.50	0.23

Table 10. Motivation Score Norms Based on Study Level.

Factor	Mean	SD	Median	Min	Max	Range	SE
<i>Level 1: Master's Degree, PhD, Engineering or Business School, MBA</i>							
Idea Sharing	5.13	1.94	5.00	0.00	10.00	10.00	0.13
Intellectual Curiosity	5.85	1.80	5.60	1.90	10.00	8.10	0.12
Surpassing	4.80	1.97	5.00	0.00	10.00	10.00	0.14
Remuneration	5.12	2.56	5.00	0.00	10.00	10.00	0.18
Influence	5.74	2.24	5.60	0.00	10.00	10.00	0.16
Feedback	3.97	2.11	3.80	0.00	8.80	8.80	0.15
Competition	2.89	2.14	2.50	0.00	8.80	8.80	0.15
Career Opportunities	6.63	1.88	6.90	0.60	10.00	9.40	0.13
Mobility	3.16	2.12	3.10	0.00	10.00	10.00	0.15
Autonomous Working Conditions	6.02	2.17	6.30	0.60	10.00	9.40	0.15

Well-being	4.53	2.00	4.40	0.00	10.00	10.00	0.14
Security	5.13	2.50	5.00	0.00	10.00	10.00	0.17
Developing Others	4.63	1.91	4.40	0.00	9.40	9.40	0.13
Social Utility	5.74	2.08	5.60	0.60	10.00	9.40	0.14
Social Environment	5.88	1.77	5.60	1.30	9.40	8.10	0.12

Factor	Mean	SD	Median	Min	Max	Range	SE
--------	------	----	--------	-----	-----	-------	----

Level 2: Bachelor's Degree, First-year Masters

Idea Sharing	5.14	1.82	5.00	0.60	10.00	9.40	0.09
Intellectual Curiosity	5.54	1.80	5.60	0.60	10.00	9.40	0.09
Surpassing	4.43	1.90	4.40	0.00	9.40	9.40	0.10
Remuneration	5.54	2.55	5.60	0.00	10.00	10.00	0.13
Influence	5.27	2.05	5.00	0.00	10.00	10.00	0.10
Feedback	3.85	1.95	3.80	0.00	10.00	10.00	0.10
Competition	2.92	2.06	2.50	0.00	9.40	9.40	0.10
Career Opportunities	6.59	2.04	6.90	0.00	10.00	10.00	0.10
Mobility	3.43	2.21	3.10	0.00	9.40	9.40	0.11

Autonomous Working Conditions	5.96	2.17	5.60	0.00	10.00	10.00	0.11
Well-being	4.63	1.99	4.40	0.00	10.00	10.00	0.10
Security	5.81	2.39	5.60	0.00	10.00	10.00	0.12
Developing Others	4.60	1.89	4.40	0.00	10.00	10.00	0.10
Social Utility	5.66	2.25	5.60	0.60	10.00	9.40	0.11
Social Environment	5.80	1.88	5.60	0.60	10.00	9.40	0.10

Factor	Mean	SD	Median	Min	Max	Range	SE
--------	------	----	--------	-----	-----	-------	----

Level 3: 2 years of Vocational or University Studies

Idea Sharing	5.13	1.95	5.00	0.00	10.00	10.00	0.16
Intellectual Curiosity	5.44	1.94	5.60	0.60	10.00	9.40	0.16
Surpassing	4.01	2.02	3.80	0.00	9.40	9.40	0.17
Remuneration	6.15	2.75	6.30	0.00	10.00	10.00	0.23
Influence	5.20	2.17	5.60	0.00	10.00	10.00	0.18
Feedback	3.78	1.99	3.80	0.00	9.40	9.40	0.17
Competition	2.67	2.38	1.90	0.00	9.40	9.40	0.20

Career Opportunities	6.54	2.20	6.90	0.60	10.00	9.40	0.19
Mobility	3.45	2.41	3.10	0.00	10.00	10.00	0.20
Autonomous Working Conditions	6.57	2.26	6.30	1.30	10.00	8.70	0.19
Well-being	4.17	2.29	3.80	0.00	9.40	9.40	0.19
Security	6.34	2.47	6.90	0.60	10.00	9.40	0.21
Developing Others	4.18	1.88	3.80	0.60	8.80	8.20	0.16
Social Utility	5.91	2.39	5.60	0.00	10.00	10.00	0.20
Social Environment	5.63	2.17	5.60	0.00	10.00	10.00	0.18

Factor	Mean	SD	Median	Min	Max	Range	SE
--------	------	----	--------	-----	-----	-------	----

Level 4: High School Diploma

Idea Sharing	4.42	1.76	4.40	1.30	9.40	8.10	0.18
Intellectual Curiosity	5.12	1.85	5.00	1.30	10.00	8.70	0.19
Surpassing	4.24	1.91	4.40	0.60	9.40	8.80	0.20
Remuneration	6.36	2.30	6.30	1.90	10.00	8.10	0.24
Influence	5.05	2.05	5.00	1.30	9.40	8.10	0.21

Feedback	4.12	2.14	4.40	0.00	9.40	9.40	0.22
Competition	2.54	2.28	1.90	0.00	9.40	9.40	0.24
Career Opportunities	6.92	1.93	6.90	0.60	10.00	9.40	0.20
Mobility	3.27	2.08	3.10	0.00	10.00	10.00	0.22
Autonomous Working Conditions	6.41	2.20	6.90	1.30	10.00	8.70	0.23
Well-being	4.44	2.13	4.40	0.00	9.40	9.40	0.22
Security	6.54	2.06	6.30	0.00	10.00	10.00	0.21
Developing Others	4.39	1.93	4.40	0.00	8.80	8.80	0.20
Social Utility	5.69	2.47	5.60	0.60	10.00	9.46	0.26
Social Environment	5.65	2.04	5.60	0.00	10.00	10.00	0.21

Factor	Mean	SD	Median	Min	Max	Range	SE
--------	------	----	--------	-----	-----	-------	----

Level 5: Trades Training, No High School Diploma

Idea Sharing	5.31	2.35	5.60	1.30	8.80	7.50	0.61
Intellectual Curiosity	5.25	1.67	5.60	1.30	8.10	6.80	0.43
Surpassing	4.64	1.47	4.40	2.50	8.10	5.60	0.38

Remuneration	5.73	2.74	6.90	0.00	8.80	8.80	0.71
Influence	4.97	2.41	5.60	1.30	8.80	7.50	0.62
Feedback	4.01	1.68	3.80	1.90	7.50	5.60	0.43
Competition	4.05	1.69	4.40	0.60	7.50	6.90	0.44
Career Opportunities	5.10	1.88	5.00	1.90	9.40	7.50	0.49
Mobility	3.72	1.89	3.80	0.00	6.30	6.30	0.49
Autonomous Working Conditions	5.77	1.94	5.60	3.10	10.00	6.90	0.50
Well-being	4.59	2.08	4.40	0.60	8.10	7.50	0.54
Security	5.84	2.64	5.00	1.90	10.00	8.10	0.68
Developing Others	5.44	2.01	6.30	1.30	8.80	7.50	0.52
Social Utility	5.05	1.81	4.40	2.50	9.40	6.90	0.47
Social Environment	5.72	1.91	5.60	3.10	10.00	6.90	0.49

Factor	Mean	SD	Median	Min	Max	Range	SE
--------	------	----	--------	-----	-----	-------	----

Level 6: Students

Idea Sharing	5.37	1.77	5.30	3.10	7.50	4.40	0.51
--------------	------	------	------	------	------	------	------

Intellectual Curiosity	5.65	2.10	5.30	2.50	9.40	6.90	0.61
Surpassing	4.65	2.10	4.40	0.60	8.10	7.50	0.61
Remuneration	4.75	2.03	5.00	0.60	6.90	6.30	0.59
Influence	4.35	2.20	4.10	0.60	6.90	6.30	0.64
Feedback	4.18	1.93	4.40	1.30	6.90	5.60	0.56
Competition	4.08	1.70	3.80	1.90	6.90	5.00	0.49
Career Opportunities	5.89	1.46	5.60	3.80	8.10	4.30	0.42
Mobility	3.91	1.10	3.80	2.50	5.60	3.10	0.32
Autonomous Working Conditions	5.53	2.15	5.30	1.30	10.00	8.70	0.62
Well-being	5.53	1.87	5.00	3.80	10.00	6.20	0.54
Security	4.76	2.06	5.00	0.60	6.90	6.30	0.59
Developing Others	5.58	1.39	5.95	3.10	7.50	4.40	0.40
Social Utility	5.17	1.91	4.70	2.50	8.10	5.60	0.55
Social Environment	5.80	1.86	5.00	3.80	8.80	5.00	0.54

Factor	Mean	SD	Median	Min	Max	Range	SE
<i>Not Defined</i>							
Idea Sharing	4.62	1.84	5.00	1.90	7.50	5.60	0.55
Intellectual Curiosity	4.95	1.58	5.60	1.90	6.90	5.00	0.48
Surpassing	3.43	1.55	3.80	1.30	5.60	4.30	0.47
Remuneration	6.15	2.48	5.60	2.50	9.40	6.90	0.75
Influence	4.10	1.80	4.40	0.60	7.50	6.90	0.54
Feedback	4.28	2.82	3.80	0.00	8.10	8.10	0.85
Competition	1.93	2.13	1.90	0.00	5.60	5.60	0.64
Career Opportunities	6.55	1.87	6.30	3.10	9.40	6.30	0.56
Mobility	4.61	2.21	5.00	1.30	8.80	7.50	0.67
Autonomous Working Conditions	7.23	2.32	8.10	3.10	9.40	6.30	0.70
Well-being	5.01	2.09	5.60	1.30	7.50	6.20	0.63
Security	6.72	1.68	6.90	4.40	9.40	5.00	0.51
Developing Others	4.45	2.24	4.40	1.30	8.10	6.80	0.67

Social Utility	5.41	2.59	5.60	1.30	10.00	8.70	0.78
Social Environment	5.75	2.50	5.00	1.30	9.40	8.10	0.75

Table 11. Motivation Score Norms based on Country of Origin.

Factor	Mean	SD	Median	Min	Max	Range	SE
<i>USA</i>							
Idea Sharing	4.78	1.83	5.00	0.00	10.00	10.00	0.08
Intellectual Curiosity	5.41	1.84	5.60	0.60	10.00	9.40	0.08
Surpassing	4.05	1.83	4.40	0.00	9.40	9.40	0.08
Remuneration	6.18	2.51	6.30	0.00	10.00	10.00	0.11
Influence	5.27	2.10	5.00	0.00	10.00	10.00	0.09
Feedback	3.71	2.08	3.80	0.00	10.00	10.00	0.09
Competition	2.77	2.26	2.50	0.00	9.40	9.40	0.10
Career Opportunities	6.68	2.13	6.90	0.00	10.00	10.00	0.09
Mobility	3.36	2.32	3.10	0.00	10.00	10.00	0.10
Autonomous Working Conditions	6.49	2.15	6.30	0.00	10.00	10.00	0.09
Well-being	4.35	2.11	4.40	0.00	10.00	10.00	0.09

Security	6.44	2.26	6.30	0.00	10.00	10.00	0.10
Developing Others	4.23	1.85	4.40	0.00	9.40	9.40	0.08
Social Utility	5.72	2.38	5.60	0.60	10.00	9.40	0.10
Social Environment	5.75	2.02	5.60	0.00	10.00	10.00	0.09

Factor	Mean	SD	Median	Min	Max	Range	SE
--------	------	----	--------	-----	-----	-------	----

India

Idea Sharing	5.36	1.63	5.60	1.90	10.00	8.10	0.11
Intellectual Curiosity	5.38	1.63	5.60	1.90	10.00	8.10	0.11
Surpassing	5.05	1.75	5.00	0.00	9.40	9.40	0.12
Remuneration	4.92	2.01	5.00	1.30	10.00	8.70	0.14
Influence	5.04	1.85	5.00	0.00	10.00	10.00	0.13
Feedback	4.51	1.73	4.40	0.60	8.80	8.20	0.12
Competition	4.25	1.80	4.40	0.00	8.10	8.10	0.12
Career Opportunities	5.92	1.63	5.60	0.60	10.00	9.40	0.11
Mobility	3.92	1.97	3.80	0.00	8.80	8.80	0.13

Autonomous Working Conditions	5.35	1.84	5.60	0.00	10.00	10.00	0.13
Well-being	5.07	1.76	5.00	0.00	10.00	10.00	0.12
Security	4.83	1.82	5.00	0.00	10.00	10.00	0.12
Developing Others	5.06	1.66	5.00	0.00	9.40	9.40	0.11
Social Utility	5.22	1.86	5.00	0.00	10.00	10.00	0.13
Social Environment	5.30	1.59	5.00	1.30	9.40	8.10	0.11

Factor	Mean	SD	Median	Min	Max	Range	SE
--------	------	----	--------	-----	-----	-------	----

Others

Idea Sharing	5.39	2.02	5.00	1.30	10.00	8.70	0.17
Intellectual Curiosity	5.99	1.94	6.30	1.30	10.00	8.70	0.16
Surpassing	5.02	2.23	5.00	0.00	10.00	10.00	0.18
Remuneration	4.77	2.69	5.00	0.00	10.00	10.00	0.22
Influence	5.70	2.45	5.60	0.60	10.00	9.40	0.20
Feedback	4.22	2.13	4.40	0.00	9.40	9.40	0.18
Competition	2.23	1.96	1.90	0.00	9.40	9.40	0.16

Career Opportunities	6.51	2.03	6.90	0.60	10.00	9.40	0.17
Mobility	3.27	2.09	3.10	0.00	10.00	10.00	0.17
Autonomous Working Conditions	5.80	2.24	5.60	1.30	10.00	8.70	0.19
Well-being	4.40	1.98	4.40	0.00	10.00	10.00	0.16
Security	4.81	2.65	4.70	0.00	10.00	10.00	0.22
Developing Others	5.08	1.84	5.00	0.60	8.80	8.20	0.15
Social Utility	5.86	2.15	5.60	0.60	10.00	9.40	0.18
Social Environment	6.13	1.75	6.30	0.60	10.00	9.40	0.15

6. Reliability

Reliability refers to the extent to which an assessment is free from error and the degree to which items on a scale are measuring the same construct. For a measure to be reliable, the same results must be consistently generated over time. Reliability is important for an assessment as it enables us to have confidence that scores on a test are really typical of an individual's behaviour or attitude. A primary concern, when developing and using tests, is the extent to which random measurement errors influence test performance. If a test is unreliable, it is impossible for it to be valid as accuracy of results (validity) depends on the consistency with which the same results are produced. High reliability of an assessment helps to guard against biases that may be caused from errors in human judgment during the recruitment and selection process.

6.1. Empirical Reliability

Reliability indicates the degree of precision of the measurement of a test and is, in general, defined as the proportion of the variance of the true score and the variance of the observed test score (i.e. the amount of variance in the measured test score reflecting true differences of the participants). Per definition, reliability takes a value between 0 (only error variance) to 1 (only true variance).

As recommended by Brown & Maydeu-Olivares (2012) and du Trois (2013), reliability for **MOTIVATION+** was estimated as *empirical reliability*. In this approach, the error variance is approximated by the measurement error observed in the posterior distribution of the estimated trait scores. Consequently, the reliability estimates are directly dependent on the observed credibility of the estimated trait scores. It is important to keep in mind that this credibility is not uniform across the whole scale but - depending on the item difficulties - specific to a certain trait estimate (more extreme traits are usually measured with less precision). The reliability estimates below can accordingly be seen as an average of reliabilities over the range of all observed trait scores of a specific trait.

The reliability for **MOTIVATION+** was computed on the English-speaking sample ($n = 915$), and can be seen in Table 12. The median reliability over all subscales of **MOTIVATION+** is 0.79.

Table 12. Empirical Reliability for All Factors.

Factor	Reliability
Idea Sharing	0.57
Appraisal	0.61

Social Environment	0.60
Intellectual Curiosity	0.47
Social Utility	0.69
Autonomous Working Conditions	0.66
Mobility	0.68
Career Opportunities	0.64
Remuneration	0.77
Developing Others	0.61
Influence	0.63
Surpassing	0.55
Competition	0.74
Well-being	0.63
Security	0.76

7. Validity

Validity refers to the extent to which an assessment measures what it claims to measure, and that this is well-founded and accurately corresponds to actual behaviour. In psychometrics, validity relates to the degree to which practical evidence and scientific theory support the interpretations of test scores. Therefore, a test can be reliable but not valid (one can consistently get the wrong answer) but it cannot be valid without being reliable, as confidence in the accuracy of results depends on the consistency with which we obtain the same results. Established validity protects practitioners from faulty, costly, unethical and legally risky decisions.

Validity is derived from the Latin word 'validus', meaning strong. According to the Standards for Educational and Psychological Testing (Standards; APA, AERA, & NCME, 2014), validation is a process of providing evidence for the scientific basis of interpreting assessment scores. The process of validation therefore depends on evidence supporting: a) test content, b) response processes, c) internal structure, d) relations to other variables, and e) consequences of testing. **MOTIVATION+** was validated by following a thorough multistage process that ensured items and factors were accurate, representative, consistent, clear, fair and culturally-free.

7.1. Concurrent Validity

Concurrent validity measures whether a method is concurrent with the results of another similar, tried and tested method. In this case, in order to establish concurrent validity for **MOTIVATION+**, the components of the assessment must strongly correlate with corresponding components on other established motivation-based questionnaires. Concurrent validity also requires that the two tests are taken at the same time, or with little time between them, so that the correlation is pure and unaltered by changes over time. This chapter details the results of the concurrent validity study of **MOTIVATION+** and the Munster Work value Measure (MWVM).

7.1.1. The Munster Work Value Measure (MWVM)

The Munster Work Value Measure (MWVM) covers 21 work values from five value clusters. Table 13 shows the correlations between the factors of **MOTIVATION+** and MWVM.

Table 13. Correlation between Factors of MWVM and *MOTIVATION+*.

MOTIV- ATION ⇒ MWVM ↓	Autono- mous Working Conditio- ns	Career Oppor- tunities	Surpas- sing	Compe- tition	Develo- ping Others	Apprai- sal	Influen- ce	Intellec- tual Curiosi- ty	Mobility	Idea Sharing	Remun- eration	Security	Social Enviro- nment	Social Utility	Well- being
Appreciation	-0.04	0.02	0.05	0.15	-0.10	0.19	0.01	-0.15	0.02	-0.11	-0.07	-0.17	-0.05	0.18	0.05
Self-realization	-0.12	0.04	0.09	0.05	0.03	0.01	-0.08	0.05	0.01	0.15	-0.19	-0.18	0.00	0.16	0.08
Security	0.02	0.24	-0.20	-0.17	-0.14	-0.10	0.00	0.02	-0.21	-0.20	0.26	0.40	-0.03	0.03	-0.08
Enjoyment	-0.03	0.07	0.04	0.00	-0.06	-0.05	-0.09	-0.04	0.00	-0.04	-0.06	-0.11	0.16	0.11	0.11
Autonomy	0.30	0.10	-0.21	-0.15	-0.16	-0.19	0.19	0.04	-0.12	-0.06	0.18	0.07	0.03	-0.06	-0.05
Money	-0.01	0.33	-0.11	-0.02	-0.17	-0.06	0.08	-0.03	-0.15	-0.38	0.50	0.19	-0.17	-0.21	-0.04
Leisure Time	0.16	0.08	-0.28	-0.14	-0.03	-0.20	0.08	0.00	-0.11	0.02	0.11	0.10	0.12	-0.09	0.10
Variety	-0.01	0.00	-0.08	-0.01	-0.06	-0.08	-0.06	0.17	0.15	0.04	-0.10	-0.06	0.04	0.08	-0.01

Social Contact	-0.22	-0.14	0.07	0.16	0.13	-0.04	-0.09	-0.06	0.17	0.20	-0.36	-0.33	0.23	0.28	0.15
Advancement	-0.12	0.45	0.04	-0.08	-0.06	-0.10	0.05	0.12	-0.18	-0.23	0.17	0.04	-0.15	0.00	0.00
Achievement	-0.09	0.12	0.12	-0.07	-0.10	-0.06	0.00	0.13	-0.13	0.04	0.01	-0.05	0.03	0.05	0.05
Stability	0.02	0.25	-0.20	-0.21	-0.06	-0.15	0.05	0.06	-0.24	-0.06	0.21	0.32	-0.01	-0.03	-0.06
Learning	-0.27	0.03	0.25	-0.02	0.10	0.07	-0.09	0.23	0.08	0.12	-0.26	-0.20	-0.01	0.16	0.02
Status	-0.24	0.13	0.19	0.13	-0.02	0.11	0.02	-0.02	0.06	-0.15	-0.03	-0.13	-0.15	0.03	0.07
Helping	-0.35	-0.17	0.16	0.06	0.12	0.12	-0.17	-0.02	0.14	0.24	-0.38	-0.35	0.20	0.53	0.05
Interesting Work	-0.14	0.01	0.13	-0.09	0.05	-0.14	-0.12	0.12	0.04	0.20	-0.16	-0.19	0.21	0.15	0.07
Meaningful Work	-0.14	0.16	0.03	-0.13	0.11	-0.10	-0.13	-0.02	-0.04	0.10	-0.18	-0.14	0.18	0.30	0.09
Health	-0.23	0.00	0.02	0.03	0.13	-0.02	-0.25	-0.04	0.02	0.17	-0.20	-0.19	0.12	0.12	0.36
Legacy	-0.23	-0.13	0.12	0.19	-0.01	0.12	-0.09	-0.12	0.23	0.06	-0.24	-0.28	0.02	0.22	0.18

Influence	-0.23	-0.08	0.21	0.22	0.00	0.10	-0.04	-0.09	0.13	0.03	-0.17	-0.20	-0.01	0.10	0.09
Generativity	-0.42	-0.18	0.25	0.17	0.21	0.04	-0.21	0.04	0.20	0.22	-0.35	-0.36	0.10	0.30	0.18

The correlation coefficient is a numerical way to quantify the relationship between two variables, and ranges between -1 and 1. The closer the value to 1, the stronger the relationship. The strongest correlation for the factor *Autonomous Working Condition* lies with Autonomy (0.30). The strongest correlation for the factor *Competition* lies with Influence (0.22). For the factor *Career Opportunities*, the strongest correlation lies with Advancement (0.45). For the factor *Intellectual Curiosity*, the strongest correlation lies with Learning (0.23). For the factor *Surpassing*, the strongest correlation lies with Learning (0.25) and Generativity (0.25). For the factor *Idea-Sharing*, the strongest correlation lies with Helping (0.24). The strongest correlation for the factor *Well-being* lies with Health (0.36). For the factor *Influence*, the strongest correlation lies with Autonomy (0.19). The strongest correlation for the factor *Remuneration* lies with Money (0.50). For the factor *Mobility*, the strongest correlation lies with Legacy (0.23) and for the factor *Security*, the strongest correlation lies with Security (0.40). The strongest correlation for the factor *Social Environment* lies with Social Contact (0.23). For the factor *Social Utility*, the strongest correlation lies with Helping (0.50). The strongest correlation for the factor *Developing Others* lies with Generativity (0.21) and for the factor *Appraisal*, it lies with Appreciation (0.19).

7.2. Construct Validity

Construct validity refers to the appropriateness of inferences made on the basis of observation or measurement. Construct validity is essential to the overall validity (perceived and actual) of a scale and is particularly valuable when there is much subjectivity to concepts. When a construct is not clearly or thoroughly defined, we are unable to make direct inferences between the construct and other behaviours (Cronbach & Meehl, 1955). Often there is no accepted unit of measurement for constructs; even fairly well-known concepts such as intelligence are open to debate. Therefore, the construct validity of a scale may be threatened if the construct is: a) defined as too broad or too narrow, b) mislabelled as a specific dimension of or component within the construct, c) confounded by other related constructs that mask the effects of the main construct, or d) the construct was developed with insufficient research. Therefore, in order to develop a scale that measures motivations, values and satisfaction at work, the construct must reflect known theories that define it, identify the components that it is comprised of and pinpoints positive and negative attributes associated with each dimension. For work-based assessments, construct validity is particularly important as it: a) adds legitimacy and acceptability to the standardised measurement of employee behaviours, b) facilitates understanding of organisational implications of findings, and c) enables organisations and individuals to tailor interventions to meet desired performance targets. For **MOTIVATION+**, construct validity was established using two approaches: factor correlations and confirmatory factor analysis.

7.2.1. Inter-factor Correlations

The factors in **MOTIVATION+** measure motivations, values and satisfaction at work, however, they all measure different factors of it. In other words, if someone scores highly

on one factor, it does not mean that they will score highly on all factors. As mentioned in Chapter 7.1.1., the correlation coefficient is a numerical way to quantify the relationship between two variables, and ranges between -1 and 1. The closer the value to 1, the stronger the relationship. The correlation coefficient does not imply causality; it merely signifies the association between two variables. Traditionally, factor correlations are measured using Pearson (1895) correlation.

Table 14. Inter-factor Correlations.

	Idea Sharing	Intellec- tual Curiosi- ty	Surpass- ing	Remun- eration	Influen- ce	Apprai- sal	Compet- ition	Career Oppor- tunities	Mobility	Auton- omous Working Condi- tions	Well- being	Security	Develo- ping Others	Social Utility
Intellectual Curiosity	0.06													
Surpassing	-0.10	0.11												
Remuneration	-0.49	-0.18	-0.24											
Influence	-0.15	0.02	0.12	0.15										
Appraisal	-0.13	-0.14	0.29	-0.10	-0.08									
Competition	-0.16	-0.19	0.30	-0.15	-0.13	0.30								
Career Opportunities	-0.38	0.04	-0.04	0.41	0.18	-0.07	-0.47							
Mobility	0.03	0.02	0.12	-0.27	-0.21	0.00	0.35	-0.48						
Autonomous Working Conditions	-0.14	0.00	-0.42	0.22	0.21	-0.37	-0.29	0.09	-0.11					
Well-being	0.14	-0.03	-0.03	-0.28	-0.42	0.05	0.16	-0.17	0.03	-0.16				
Security	-0.29	-0.06	-0.45	0.40	-0.03	-0.29	-0.25	0.28	-0.19	0.15	-0.24			
Developing Others	0.28	-0.25	-0.07	-0.31	-0.30	0.04	0.10	-0.25	-0.09	-0.33	0.22	-0.17		
Social Utility	0.25	-0.10	-0.18	-0.25	-0.23	-0.11	-0.23	-0.08	0.01	-0.09	-0.22	-0.09	0.07	
Social Environment	0.39	-0.14	-0.20	-0.33	-0.19	-0.30	-0.32	-0.20	-0.18	0.05	0.12	-0.09	0.26	0.31

7.3. MOTIVATION+ and Equal Opportunities

Organisations are increasingly under pressure to ensure that tools used to inform employee recruitment, selection, development, promotion and performance measurement decisions are fair, objective and accurate. This pressure stems from a progressively knowledgeable applicant pool, a more sophisticated labour force and stringent local and international employment legislation and testing standards. Equal opportunities therefore represent a critical consideration for any modern-day work assessment, and an assessment is only considered to be truly valid when it is appropriate for use with different groups. **MOTIVATION+** is a fair and accurate measure of an individual's motivations, values and satisfaction at work, and HR practitioners and psychologists can be confident of its application.

Measurement Equivalence

Measurement Equivalence (ME) refers to the consistency of measurement across some specified group demarcation such as nationality, ethnicity and gender. The focus of ME is to ensure that individuals from different groups with the same standing on an attribute have the same set of observations on an assessment (Drasgow, 1987; McLeary & Cruise, 2012). ME helps to determine the extent to which respondents are interpreting items similarly, and identified differences across groups reflect actual differences in the trait being measured (Drasgow, 1987). One approach to assessing measurement equivalence is differential item functioning analysis.

T-tests and ANOVA

To explore the differences between groups in the sample, an independent sample t-test was performed between the groups; t-tests and ANOVA were performed between genders, age groups, study levels, and countries of origin.

Gender

In order to check for differences in scores between genders, an independent sample t-test was conducted to compare all the **MOTIVATION+** factors between females (n = 465) and males (n = 399) (see Table 15).

Table 15. T-tests for Factors by Gender.

Factor	Female	Male	T.	df	P
Idea Sharing	5.04	5.08	-0.27	862	0.78

Intellectual Curiosity	5.45	5.66	-1.65	862	0.10
Surpassing	4.34	4.52	-1.30	862	0.20
Remuneration	5.74	5.49	1.45	862	0.15
Influence	5.20	5.45	-1.71	862	0.10
Appraisal	3.90	3.93	-0.24	862	0.81
Competition	2.65	3.10	-3.10	862	0.00
Career Opportunities	6.72	6.44	2.08	862	0.04
Mobility	3.36	3.39	-0.20	862	0.85
Autonomous Working Conditions	6.19	6.06	0.90	862	0.37
Well-being	4.42	4.65	-1.69	862	0.09
Security	5.95	5.64	1.87	862	0.06
Developing Others	4.45	4.65	-1.49	862	0.14
Social Utility	5.91	5.47	2.89	862	0.00
Social Environment	5.87	5.66	1.54	862	0.12

The t-tests found that there were statistically significant differences between the groups, with females scoring higher than males on *Career Opportunities* and *Social Utility*; and males scoring higher than females on *Competition*.

Age Group

In order to check for differences in scores between age group, an ANOVA was conducted to compare all **MOTIVATION+** factors between five age groups: 18 – 25 (n = 158), 26 – 33 (n = 262), 34 – 41 (n = 211), 42 – 49 (n = 102), 50 – 56 (n = 76), and 57+ (n = 55) (see Table 16).

Table 16. ANOVA by Age Group.

Factor	18-25	26-33	34-41	42-49	50-56	57+	F	df	p-value
Idea Sharing	5.17	4.90	4.94	5.00	5.26	5.75	2.317×10^{35}	5	0.042
Intellectual Curiosity	5.39	5.72	5.33	5.55	5.58	5.89	1.68×10^{35}	5	0.137
Surpassing	4.95	4.50	4.00	4.55	4.27	4.13	4.989×10^{35}	5	0.000
Remuneration	5.06	5.76	6.10	5.56	5.44	5.16	3.573×10^{35}	5	0.003
Influence	4.97	5.18	5.45	5.37	5.71	5.74	2.169×10^{35}	5	0.056
Appraisal	4.34	4.14	3.65	3.80	3.66	3.17	4.677×10^{35}	5	0.000
Competition	3.71	3.24	2.51	2.33	1.93	2.14	13.78×10^{35}	5	5.78
Career Opportunities	6.28	6.57	6.95	7.06	6.32	5.71	5.774×10^{35}	5	2.98
Mobility	3.85	3.55	3.05	2.87	3.27	3.57	3.987×10^{35}	5	0.001
Autonomous Working Conditions	5.46	5.72	6.48	6.24	7.07	7.16	11.8×10^{35}	5	4.71
Well-being	4.97	4.76	4.44	4.14	4.07	3.82	5.08×10^{35}	5	0.000
Security	5.05	5.67	6.38	6.31	5.86	5.45	6.921×10^{35}	5	2.40

Developing Others	4.88	4.43	4.37	4.50	4.85	4.45	1.947*10 ³⁵	5	0.084
Social Utility	5.43	5.58	5.69	5.86	5.99	6.46	2.219*10 ³⁵	5	0.051
Social Environment	5.66	5.48	5.81	6.08	5.91	6.59	4.021*10 ³⁵	5	0.001

The ANOVA found that there were significant differences for all 15 of the factors of **MOTIVATION+**. Post-hoc analysis was conducted using pairwise t-tests (Bonferroni correction) in order to see where these differences occurred:

For *Idea Sharing*, those in the age group 57+ (M = 5.75) scored higher than those in the age groups 18-25 (M = 5.17, p = 0.049), 26-33 (M = 4.90, p = 0.002), 34-41 (M = 4.94, p = 0.005), and 42-49 (M = 5.00, p = 0.018).

For *Intellectual Curiosity*, those in the age group 34-41 (M = 5.33) scored lower than those in the age group 26-33 (M = 5.72, p = 0.022). Those in the age group 57+ (M = 5.89) scored higher than those in the age group 34-41 (M = 5.33, p = 0.045).

For *Surpassing*, those in the age group 26-33 (M = 4.50) scored lower than those in the age group 18-25 (M = 4.95, p = 0.021). Those in the age group 34-41 (M = 4.00) scored lower than those in the age group 26-33 (M = 4.50, p = 0.005). Those in the age group 42-49 (M = 4.55) scored higher than those in the age group 34-41 (M = 4.00, p = 0.018). Those in the age group 50-56 (M = 4.27) scored lower than those in the age group 18-25 (M = 4.95, p = 0.011). Those in the age group 57+ (M = 4.13) scored lower than those in the age group 18-25 (M = 4.95, p = 0.006).

For *Remuneration*, those in the age group 26-33 (M = 5.76) scored higher than those in the age group 18-25 (M = 5.06, p = 0.007). Those in the age group 34-41 (M = 6.10) scored higher than those in the age group 18-25 (M = 5.06, p < 0.001). Those in the age group 57+ (M = 5.16) scored lower than those in the age group 34-41 (M = 6.10, p = 0.016).

For *Influence*, those in the age group 34-41 (M = 5.45) scored higher than those in the age group 18-25 (M = 4.97, p = 0.032). Those in the age group 50-56 (M = 5.71) scored higher than those in the age group 18-25 (M = 4.97, p = 0.022).

For *Appraisal*, those in the age group 34-41 (M = 3.65) scored lower than those in the age groups 18-25 (M = 4.34, p = 0.001), and 26-33 (M = 4.14, p = 0.009). Those in the age group 42-29 (M = 3.80) scored lower than those in the age group 18-25 (M = 4.34, p = 0.033). Those in the age group 50-56 (M = 3.66) scored lower than those in the age group 18-25 (M = 4.34, p = 0.014). Those in the age group 57+ (M = 3.17) scored lower than those in the age groups 18-25 (M = 4.34, p < 0.001), and 26-33 (M = 4.14, p = 0.001).

For *Competition*, those in the age group 26-33 (M = 3.24) scored lower than those in the

age group 18-25 ($M = 3.71$, $p = 0.023$). Those in the age group 34-41 ($M = 2.51$) scored lower than those in the age group 26-33 ($M = 3.24$, $p = < 0.001$). Those in the age group 42-49 ($M = 2.33$) scored lower than those in the age group 26-33 ($M = 3.24$, $p = < 0.001$). Those in the age group 50-56 ($M = 1.93$) scored lower than those in the age group 34-41 ($M = 2.51$, $p = 0.038$). Those in the age group 57+ ($M = 2.14$) scored lower than those in the age group 26-33 ($M = 3.24$, $p = < 0.001$).

For *Career Opportunities*, those in the age group 34-41 ($M = 6.95$) scored higher than those in the age groups 18-25 ($M = 6.28$, $p = 0.001$), and 26-33 ($M = 6.57$, $p = 0.037$). Those in the age group 42-49 ($M = 7.06$) scored higher than those in the age groups 18-25 ($M = 6.28$, $p = 0.002$), and 26-33 ($M = 6.57$, $p = 0.034$). Those in the age group 50-56 ($M = 6.32$) scored lower than those in the age groups 34-41 ($M = 6.95$, $p = 0.017$), and 42-49 ($M = 7.06$, $p = 0.014$). Those in the age group 57+ ($M = 5.71$) scored lower than those in the age group 26-33 ($M = 6.57$, $p = 0.004$).

For *Mobility*, those in the age group 34-41 ($M = 3.05$) scored lower than those in the age groups 18-25 ($M = 3.85$, $p = < 0.001$), and 26-33 ($M = 3.55$, $p = 0.014$). Those in the age group 42-49 ($M = 2.87$) scored lower than those in the age groups 18-25 ($M = 3.85$, $p = < 0.001$), and 26-33 ($M = 3.55$, $p = 0.008$).

For *Autonomous Working Conditions*, those in the age group 34-41 ($M = 6.48$) scored higher than those in the age group 26-33 ($M = 5.72$, $p = < 0.001$). Those in the age group 42-49 ($M = 6.24$) scored higher than those in the age groups 18-25 ($M = 5.46$, $p = 0.004$), and 26-33 ($M = 5.72$, $p = 0.039$). Those in the age group 50-56 ($M = 7.07$) scored higher than those in the age groups 34-41 ($M = 6.48$, $p = 0.037$), and 42-49 ($M = 6.24$, $p = 0.010$). Those in the age group 57+ ($M = 7.16$) scored higher than those in the age groups 34-41 ($M = 6.48$, $p = 0.037$), and 42-49 ($M = 6.24$, $p = 0.010$).

For *Well-being*, those in the age group 34-41 ($M = 4.44$) scored lower than those in the age group 18-25 ($M = 4.97$, $p = 0.014$). Those in the age group 42-49 ($M = 4.14$) scored lower than those in the age groups 18-25 ($M = 4.97$, $p = 0.001$), and 26-33 ($M = 4.76$, $p = 0.009$). Those in the age group 50-56 ($M = 4.07$) scored lower than those in the age groups 18-25 ($M = 4.97$, $p = < 0.001$), 26-33 ($M = 4.76$, $p = 0.002$), and 34-41 ($M = 4.44$, $p = 0.043$).

For *Security*, those in the age group 26-33 ($M = 5.67$) scored higher than those in the age group 18-25 ($M = 5.05$, $p = 0.010$). Those in the age group 34-41 ($M = 6.38$) scored higher than those in the age group 26-33 ($M = 5.67$, $p = 0.001$). Those in the age group 42-49 ($M = 6.31$) scored higher than those in the age group 26-33 ($M = 5.67$, $p = 0.023$). Those in the age group 50-56 ($M = 5.86$) scored higher than those in the age group 18-25 ($M = 5.05$, $p = 0.020$). Those in the age group 57+ ($M = 5.45$) scored lower than those in the age groups 34-41 ($M = 6.38$, $p = 0.010$), and 42-49 ($M = 6.31$, $p = 0.032$).

For *Developing Others*, those in the age group 26-33 ($M = 4.43$) scored lower than those in the age group 18-25 ($M = 4.88$, $p = 0.018$). Those in the age group 34-41 ($M = 4.37$) scored lower than those in the age group 18-25 ($M = 4.88$, $p = 0.012$).

For *Social Utility*, those in the age group 57+ (M = 6.46) scored higher than those in the age groups 18-25 (M = 5.43, p = 0.004), 26-33 (M = 5.58, p = 0.008), and 34-41 (M = 5.69, p = 0.023).

For *Social Environment*, those in the age group 42-49 (M = 6.08) scored higher than those in the age group 26-33 (M = 5.48, p = 0.007). Those in the age group 57+ (M = 6.59) scored higher than those in the age groups 18-25 (M = 5.66, p = 0.002), 34-41 (M = 5.81, p = 0.007), and 50-56 (M = 5.91, p = 0.046).

Country of Origin

In order to check for differences in scores between countries of origin, an ANOVA was conducted to compare all **MOTIVATION+** factors between three 3 categories: USA (n = 493), India (n = 205), and Others (n = 166) (see Table 18).

Table 18. ANOVA by Country of Origin.

Factor	USA	India	Others	F	df	p-value
Idea Sharing	4.78	5.36	5.39	11.847*10 ³⁵	2	0.000
Intellectual Curiosity	5.41	5.38	5.99	5.851*10 ³⁵	2	0.003
Surpassing	4.05	5.05	5.02	30.558*10 ³⁵	2	0.000
Remuneration	6.18	4.92	4.77	33.765*10 ³⁵	2	0.000
Influence	5.27	5.04	5.70	3.827*10 ³⁵	2	0.023
Appraisal	3.71	4.51	4.22	15.554*10 ³⁵	2	0.000
Competition	2.77	4.25	2.23	64.087*10 ³⁵	2	0.000
Career Opportunities	6.68	5.92	6.51	14.365*10 ³⁵	2	0.000
Mobility	3.36	3.92	3.27	6.881*10 ³⁵	2	0.001

Autonomous Working Conditions	6.49	5.35	5.80	27.908×10^{35}	2	0.000
Well-being	4.35	5.07	4.40	12.491×10^{35}	2	0.000
Security	6.44	4.83	4.81	62.388×10^{35}	2	0.000
Developing Others	4.23	5.06	5.08	24.244×10^{35}	2	0.000
Social Utility	5.72	5.22	5.86	6.253×10^{35}	2	0.002
Social Environment	5.75	5.30	6.13	11.142×10^{35}	2	0.000

The ANOVA found that there were significant differences for 10 of the factors of **MOTIVATION+**. Post-hoc analysis was conducted using pairwise t-tests (Bonferroni correction) in order to see where these differences occurred:

For *Intellectual Curiosity*, those in the category India (M = 5.38) scored lower than those in the category Others (M = 5.99, $p = 0.003$). Those in the category Others (M = 5.99) scored higher than those in the category USA (M = 5.41, $p = 0.002$).

For *Influence*, those in the category India (M = 5.04) scored lower than those in the category Others (M = 5.70, $p = 0.011$). Those in the category Others (M = 5.70) scored higher than those in the category USA (M = 5.27, $p = 0.045$).

For *Appraisal*, those in the category Others (M = 4.22) scored higher than those in the category USA (M = 3.71, $p = 0.011$).

For *Competition*, those in the category Others (M = 2.23) scored lower than those in the category USA (M = 2.77, $p = 0.006$).

For *Career Opportunities*, those in the category India (M = 5.92) scored lower than those in the category Others (M = 6.51, $p = 0.01$).

For *Mobility*, those in the category India (M = 3.92) scored higher than those in the categories USA (M = 3.36, $p = 0.004$), and Others (M = 3.27, $p = 0.008$).

For *Autonomous Working Conditions*, those in the category India (M = 5.35) scored lower than those in the category Others (M = 5.80, $p = 0.046$). Those in the category Others (M = 5.80) scored lower than those in the category USA (M = 6.49, $p = 0.001$).

For *Well-being*, those in the category India (M = 5.07) scored higher than those in the

category Others (M = 4.40, p = 0.003).

For *Social Utility*, those in the category India (M = 5.22) scored lower than those in the categories USA (M = 5.72, p = 0.011), and Others (M = 5.86, p = 0.011).

For *Social Environment*, those in the category India (M = 5.30) scored lower than those in the category USA (M = 5.75, p = 0.005). Those in the category Others (M = 6.13) scored higher than those in the category USA (M = 5.75, p = 0.031).

Study Level

In order to check for differences in scores between study level, an ANOVA was conducted to compare all **MOTIVATION+** factors between six study levels: Level 1 - Master's Degree, PhD, Engineering or Business School, MBA (n = 208); Level 2 - Bachelor's Degree, First-year Master's (n = 384); Level 3 - 2 years of Vocational or University Study (n = 141); Level 4 - High School diploma (n = 93); Level 5 - Trades Training, No High School Diploma (n = 15); and Level 6 - Students (n = 12) (see Table 19).

Table 19. ANOVA by Study Level.

Factor	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	F	df	p-value
Idea Sharing	5.13	5.14	5.13	4.42	5.31	5.37	2.212*10 ^{^35}	6	0.040
Intellectual Curiosity	5.85	5.54	5.44	5.12	5.25	5.65	2.158*10 ^{^35}	6	0.045
Surpassing	4.80	4.43	4.01	4.24	4.64	4.65	3.125*10 ^{^35}	6	0.005
Remuneration	5.12	5.54	6.15	6.36	5.73	4.75	4.015*10 ^{^35}	6	0.001
Influence	5.74	5.27	5.20	5.05	4.97	4.35	2.783*10 ^{^35}	6	0.011
Appraisal	3.97	3.85	3.78	4.15	4.01	4.18	0.499*10 ^{^35}	6	0.810
Competition	2.89	2.92	2.67	2.54	4.05	4.08	2.345*10 ^{^35}	6	0.023
Career Opportunities	6.63	6.59	6.54	6.92	5.10	5.89	2.063*10 ^{^35}	6	0.055
Mobility	3.16	3.43	3.45	3.27	3.72	3.91	1.193*10 ^{^35}	6	0.307
Autonomous Working Conditions	6.02	5.96	6.57	6.41	5.77	5.53	2.368*10 ^{^35}	6	0.028
Well-being	4.53	4.63	4.17	4.44	4.59	5.53	1.491*10 ^{^35}	6	0.178

Security	5.13	5.81	6.34	6.54	5.84	4.76	6.098×10^{-35}	6	2.870
Developing Others	4.63	4.60	4.18	4.39	5.44	5.58	2.236×10^{-35}	6	0.038
Social Utility	5.74	5.66	5.91	5.69	5.05	5.17	0.583×10^{-35}	6	0.744
Social Environment	5.88	5.80	5.64	5.65	5.72	5.80	0.307×10^{-35}	6	0.934

The ANOVA found that there were significant differences for 11 of the factors of **MOTIVATION+**. Post-hoc analysis was conducted using pairwise t-tests (Bonferroni correction) in order to see where these differences occurred:

For *Idea Sharing*, those in Level 4 (M = 4.42) scored lower than those in Level 1 (M = 5.13, $p = 0.002$), Level 2 (M = 5.14, $p = 0.001$), and Level 3 (M = 5.13, $p = 0.005$).

For *Intellectual Curiosity*, those in Level 2 (M = 5.54) scored lower than those in Level 1 (M = 5.85, $p = 0.049$). Those in Level 3 (M = 5.44) scored lower than those in Level 1 (M = 5.85, $p = 0.037$). Those in Level 4 (M = 5.12) scored lower than those in Level 1 (M = 5.85, $p = 0.001$), and Level 2 (M = 5.54, $p = 0.048$).

For *Surpassing*, those in Level 2 (M = 4.43) scored lower than those in Level 1 (M = 4.80, $p = 0.024$). Those in Level 3 (M = 4.01) scored lower than those in Level 1 (M = 4.80, $p < 0.001$), and Level 2 (M = 4.43, $p = 0.027$). Those in Level 4 (M = 4.24) scored lower than those in Level 1 (M = 4.80, $p = 0.020$).

For *Remuneration*, those in Level 3 (M = 6.15) scored higher than those in Level 1 (M = 5.12, $p < 0.001$), and Level 2 (M = 5.54, $p = 0.016$). Those in Level 4 (M = 6.36) scored higher than those in Level 1 (M = 5.12, $p < 0.001$), and Level 2 (M = 5.54, $p = 0.006$). Those in Level 6 (M = 4.75) scored lower than those in Level 4 (M = 6.36, $p = 0.041$).

For *Influence*, those in Level 2 (M = 5.27) scored lower than those in Level 1 (M = 5.74, $p = 0.011$). Those in Level 3 (M = 5.20) scored lower than those in Level 1 (M = 5.74, $p = 0.021$). Those in Level 4 (M = 5.05) scored lower than those in Level 1 (M = 5.74, $p = 0.010$). Those in Level 6 (M = 4.35) scored lower than those in Level 1 (M = 5.74, $p = 0.028$).

For *Competition*, those in Level 5 (M = 4.05) scored higher than those in Level 1 (M = 2.89, $p = 0.045$), Level 2 (M = 2.92, $p = 0.048$), Level 3 (M = 2.67, $p = 0.018$), and Level 4 (M = 2.54, $p = 0.012$). Those in Level 6 (M = 4.08) scored higher than those in Level 3 (M = 2.67, $p = 0.030$), and Level 4 (M = 2.54, $p = 0.020$).

For *Career Opportunities*, those in Level 5 (M = 5.10) scored lower than those in Level 1 (M = 6.63, $p = 0.005$), Level 2 (M = 6.59, $p = 0.005$), Level 3 (M = 6.54, $p = 0.008$), and Level 4 (M = 6.92, $p = 0.001$).

For *Autonomous Working Conditions*, those in Level 3 (M = 6.57) scored higher than those

in Level 1 ($M = 6.02$, $p = 0.021$), and Level 2 ($M = 5.96$, $p = 0.005$).

For *Well-being*, those in Level 3 ($M = 4.17$) scored lower than those in Level 2 ($M = 4.63$, $p = 0.022$). Those in Level 6 ($M = 5.53$) scored higher than those in Level 3 ($M = 4.17$, $p = 0.028$).

For *Security*, those in Level 2 ($M = 5.81$) scored higher than those in Level 1 ($M = 5.13$, $p = 0.001$). Those in Level 3 ($M = 6.34$) scored higher than those in Level 2 ($M = 5.81$, $p = 0.026$). Those in Level 4 ($M = 6.54$) scored higher than those in Level 2 ($M = 5.81$, $p = 0.008$). Those in Level 6 ($M = 4.76$) scored lower than those in Level 3 ($M = 6.34$, $p = 0.028$), and Level 4 ($M = 6.54$, $p = 0.015$).

For *Developing Others*, those in Level 3 ($M = 4.18$) scored lower than those in Level 1 ($M = 4.63$, $p = 0.033$), and Level 2 ($M = 4.60$, $p = 0.025$). Those in Level 5 ($M = 5.44$) scored higher than those in Level 3 ($M = 4.18$, $p = 0.015$), and Level 4 ($M = 4.39$, $p = 0.047$). Those in Level 6 ($M = 5.58$) scored higher than those in Level 3 ($M = 4.18$, $p = 0.015$), and Level 4 ($M = 4.39$, $p = 0.041$).

8. Additional Information and Considerations

MOTIVATION+ was developed for use in a range of organisational settings and hence, it is important that the appropriate norms, scores and interpretations are used in order to guide HR decisions for recruitment and selection, career development, coaching and performance management. Accurate interpretation of psychometric tests like **MOTIVATION+** helps both administrators and candidates to: a) put the assessment into context; b) effectively compare candidates across target capabilities; c) accurately identify areas for development; d) maximise fit between job requirements and candidate motivations; and e) promote the organisation as a fair and objective place to work. The current chapter gives guidelines for HR practitioners to understand and successfully interpret candidate scores of **MOTIVATION+** for different organisational objectives.

Report generation software for **MOTIVATION+** provides graphs and personalised comments for all the 15 motivational factors and their corresponding satisfaction levels in relation to the candidate's scores. The report should only be interpreted by professionals who have completed *Central Tests* accredited training course and are familiar with this manual. Training in and knowledge of the assessment process are vital as scores should be interpreted in light of information regarding reliability, validity, standard error of measurement, and any accommodations to the assessment or assessment session that were made. Scores should be presented within the context of the assessment and in a clear, meaningful and appropriate way for the target audience.

8.1. Interpreting Scores

It is important to note that all assessments by *Central Test* have been developed for HR purposes only. Therefore, no clinical conclusions can be drawn from the results – not even from extreme scores. There are six different levels of comments in total. Levels are determined by a candidate's score. Table __ provides an example of descriptors used to describe different levels of a factor. Extreme scores are defined as the lowest and highest possible values on a factor. For **MOTIVATION+**, the minimum score is set at 0 and the maximum score is set at 10. Given the ipsative format of the assessment, it is impossible to obtain extreme scores on all factors.

Each factor consists of two facets. High scores on a factor indicate that there is a high probability that the person who is being evaluated can be characterised as having an interest in that factor. Middle scores (i.e. 4-7) indicate a high congruence with the norm group and may be less of a preference for the individual. However, all comments should be viewed as hypotheses that need to be confirmed with other sources of data, such as interviews or further assessments, CV content and references.

*Table 20. Examples of Descriptors for Different Levels of the Construct in the Report Comments for **MOTIVATION+**.*

Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
Appears to be of little importance	Somewhat a motivator but does not place importance	Likely to be motivator but not a priority	Appears to have an impact on motivation	Likely to be of importance	Likely to be of great importance

8.2. Organisational Need: Career selection, Recruitment and Development

For identifying 21st century work drives, **MOTIVATION+** is an effective tool for both the employer, in the selection of job candidates on the basis of those motivators that drive a candidate; and the job candidate, in the successful selection of an appropriate career navigation.

Choosing an appropriate career path is a difficult task, and with the overwhelming number of fields that exist in the modern-day occupational world, it can be confusing to know which path to take. **MOTIVATION+** helps candidates pinpoint their most crucial motivators, thus enabling them to make more informed career choices and find greater job satisfaction. Following this is the importance of a motivation assessment in recruitment. In order to successfully hire a candidate that will feel satisfied with their job and want to remain with the company, job satisfaction of the employee should be considered significant to the recruiter. By using **MOTIVATION+**, an employer will be able to infer how appropriate a job may be for a candidate based on an objective assessment of their motivators. If the endorsed motivators of a candidate do not align with those of the job role in question, there may not be a good match between the two.

Recruitment and selection is an important organisational function which can be very time consuming and expensive. Furthermore, bad recruitment decisions have additional effects on organisational productivity, capability and sustainability. It is therefore recommended that prior to administering **MOTIVATION+**, recruiters have a detailed job description and person specifications based on a job analysis.

MOTIVATION+ helps recruiters to customise job profiles in their client account by specifying desired scores for each factor. The assessment allows the recruiter to easily compare the target profile with a candidate's profile.

Furthermore, **MOTIVATION+** can be used in line with performance evaluations, which are a key component of employee development and success. Performance reviews should be fair and balanced assessments of an employee's achievements and capabilities, and should give the opportunity to discuss expectations and accomplishments. **MOTIVATION+**

supports HR practitioners with performance reviews that can help to discuss job performance in relation to satisfaction at work; if an individual is not performing as they could be at work, it may be down to a lack of satisfaction in the particular area that they are working on. Identifying this can help the recruiter to identify whether or not the employee should be transferred to another area of the company, or to a different aspect of a project.

Whilst **MOTIVATION+** is effective in identifying areas for development, it should not be used to directly track an employee's performance progress. We therefore recommend the use of objective performance assessments or other evaluations in conjunction with **MOTIVATION+**.

References

- Anastasi, A. (1982). *Psychological testing*. New York: Macmillan.
- Anguiano-Carrasco, C., MacCann, C., Geiger, M., Seybert, J. M., & Roberts, R. D. (2015). Development of a forced-choice measure of typical-performance emotional intelligence. *Journal of Psychoeducational Assessment*, 33, 83–97.
<http://doi:10.1177/0734282914550387>
- Baron, R. A. (1991). Motivation in work settings: Reflections on the core of organizational research. *Motivation and Emotion*, 15(1), 1–8.
- Bilsky, W., & Schwartz, S. H. (1994). Values and personality. *European Journal of Personality*, 8(3), 163–181.
<http://doi.org/10.1002/per.2410080303>
- Bloch, H., Chemama, R., Gallo, A., Leconte, P., Le Ny, J.-F., Postel, J., Vurpillot, E. (1991). *Grand dictionnaire de la psychologie*. Retrieved from <http://cat.inist.fr/?aModele=afficheN&cpsidt=107818>
- Broeck, A., Vansteenkiste, M., Witte, H., Soenens, B., & Lens, W. (2010). Capturing autonomy, competence, and relatedness at work: Construction and initial validation of the Work-related Basic Need Satisfaction scale. *Journal of Occupational and Organizational Psychology*, 83(4), 981–1002.
<http://doi.org/10.1348/096317909X481382>
- Brown, A. (2016). Item response models for forced-choice questionnaires: A common framework. *Psychometrika*, 81, 135–160.
<http://doi:10.1007/s11336-014-9434-9>
- Brown, A., & Bartram, D. (2013). *The occupational personality questionnaire revolution: Applying item response theory to questionnaire design and scoring*.
humandevelopmentsolutions.com/views/archives/pdf/White-Paper-OPQ32r.pdf
- Brown, A., Inceoglu, I., & Lin, Y. (2017). Preventing rater biases in 360-degree feedback by forcing choice. *Organizational Research Methods*, 20, 121–148.
<http://doi:10.1177/1094428116668036>
- Brown, A., & Maydeu-Olivares, A. (2011). Item response modeling of forced choice questionnaires. *Educational and Psychological Measurement*, 71, 460–502.
<http://doi:10.1177/0013164410375112>
- Brown, A., & Maydeu-Olivares, A. (2012). How IRT Can Solve Problems of Ipsative Data in Forced-Choice Questionnaires. *Psychological Methods*. Advance online publication.
<http://doi:10.1037/a0030641>

- Cattell, R. B. (1944). Psychological measurement: Normative, ipsative, interactive. *Psychological Review*, 51, 292–303.
<http://doi:10.1037/h0057299>
- Christiansen, N. D., Burns, G. N., & Montgomery, G. E. (2005). Reconsidering forced-choice item formats for applicant personality assessment. *Human Performance*, 18, 267–307.
http://doi:10.1207/s15327043hup1803_4
- Clauser, B. E., & Mazor, K. M. (1998). Using Statistical Procedures to Identify Differentially Functioning Test Items. *Educational Measurement: Issues and Practice*, 17(1), 31–44.
<http://doi.org/10.1111/j.1745-3992.1998.tb00619.x>
- Cronbach, L. J., & Meehl, P. E. (1955). Construct validity in psychological tests. *Psychological Bulletin*, 52(4), 281–302.
<http://doi.org/10.1037/h0040957>
- Deci, E. L., & Ryan, R. M. (2000). The “what” and “why” of goal pursuits: Human needs and the self-determination of behaviour. *Psychological Inquiry*, 11(4), 227–268.
- Drasgow, F. (1987). Study of the measurement bias of two standardised psychological tests. *Journal of Applied Psychology*, 72(1), 19–29.
<http://doi.org/10.1037/0021-9010.72.1.19>
- Dueber, D. M., Love, A. M., Toland, M. D., & Turner, T. A. (2018). Comparison of single response format and forced-choice format instruments using thurstonian item response theory. *Educational and Psychological Measurement*.
<http://doi:10.1177/0013164417752782>
- Elizur, D. (1984). Facets of work values: A structural analysis of work outcomes. *Journal of Applied Psychology*, 69(3), 379–389.
<http://doi.org/10.1037/0021-9010.69.3.379>
- Fan, X., Thompson, B., & Wang, L. (1999). Effects of sample size, estimation methods, and model specification on structural equation modeling fit indexes. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 56–83.
- Gagné, M., & Deci, E. L. (2005). Self-determination theory and work motivation. *Journal of Organizational behaviour*, 26(4), 331–362.
<http://doi.org/10.1002/job.322>

- Gagné, M., Forest, J., Vansteenkiste, M., Crevier-Braud, L., van den Broeck, A., Aspley, A. K., ... Westbye, C. (2015). The Multidimensional Work Motivation Scale: Validation evidence in seven languages and nine countries. *European Journal of Work and Organizational Psychology*, 24(2), 178–196.
<http://doi.org/10.1080/1359432X.2013.877892>
- Gelman, A., Carlin, J. B., Stern, H. S., Dunson, D. B., Vehtari, A., & Rubin, D. B. (2013). *Bayesian Data Analysis, Third Edition*. Boca Raton: Chapman and Hall/CRC.
- Guenole, N., Brown, A., & Cooper, A. J. (2018). Forced-choice assessment of work-related maladaptive personality traits: Preliminary evidence from an application of thurstonian item response modeling. *Assessment*, 25, 513–526.
<http://doi:10.1177/1073191116641181>
- Hanson, B. A. (1998). Uniform DIF and DIF Defined by Differences in Item Response Functions. *Journal of Educational and behavioural Statistics*, 23(3), 244–253.
<http://doi.org/10.3102/10769986023003244>
- Hicks, L. E. (1970). Some properties of ipsative, normative, and forced-choice normative measures. *Psychological Bulletin*, 74, 167–184.
<http://doi:10.1037/h0029780>
- Holtzman, S., & Vezzu, S. (2011). *Confirmatory Factor Analysis and Structural Equation Modeling of Noncognitive Assessments using PROC CALIS*.
<http://www.lexjansen.com/nesug/nesug11/sa/sa07.pdf>
- Hontangas, P. M., Torre, J. de la, Ponsoda, V., Leenen, I., Morillo, D., & Abad, F. J. (2015). Comparing traditional and irt scoring of forced-choice tests. *Applied Psychological Measurement*, 39, 598–612.
<http://doi:10.1177/0146621615585851>
- Hooper, D., Coughlan, J., & Mullen, M. (2008). Structural Equation Modelling: Guidelines for Determining Model Fit. *Electronic Journal of Business Research Methods*, 6(1), 53–60.
- Hu, L., & Bentler, P. M. (1999). Cut-off criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1–55.
<http://doi.org/10.1080/10705519909540118>
- Joint Committee on *Standards for Educational and Psychological Testing* of the American Research Association, American Psychological Association and National Council on Measurement in Education. (2014). ISBN 978-0-935302-35-6 (alk. paper)
- Jöreskog, K. G., & Sörbom, D. (1993). LISREL 8: Structural Equation Modeling with the SIMPLIS Command Language. *Scientific Software International*.

- Kanfer, R. (1990). Motivation theory and industrial and organizational psychology. In M. D. Dunnette & L. M. Hough (Eds.), *Handbook of industrial and organizational psychology, Vol. 1 (2nd ed.)* (pp. 75–170). Palo Alto, CA, US: Consulting Psychologists Press.
- Kooij, D. T. A. M., De Lange, A. H., Jansen, P. G. W., Kanfer, R., & Dikkers, J. S. E. (2011). Age and work-related motives: Results of a meta-analysis. *Journal of Organizational behaviour*, 32(2), 197–225.
<http://doi.org/10.1002/job.665>
- Krumm, S., Grube, A., & Hertel, G. (2013). The Munster Work Value Measure. *Journal of Managerial Psychology*, 28(5), 532–560.
<http://doi.org/10.1108/JMP-07-2011-0023>
- Latham, G. P., & Budworth, M. H. (2006). The study of employee motivation in the 20th Century. In *Historical perspectives in industrial-organizational psychology: The first hundred years*. (pp. 353–381). Mahwah, NJ: Lawrence Erlbaum.
- Latham, G. P., & Pinder, C. C. (2005). Work Motivation Theory and Research at the Dawn of the Twenty-First Century. *Annual Review of Psychology*, 56(1), 485–516.
<http://doi.org/10.1146/annurev.psych.55.090902.142105>
- Lee, P., Lee, S., & Stark, S. (2018). Examining validity evidence for multidimensional forced choice measures with different scoring approaches. *Personality and Individual Differences*, 123, 229–235.
<http://doi:10.1016/j.paid.2017.11.031>
- Lévy-Leboyer, C. (2006). *La motivation au travail: modèles et stratégies*. Paris: Éditions d'Organisation.
- Maydeu-Olivares, A., & Böckenholt, U. (2005). Structural equation modeling of paired comparison and ranking data. *Psychological Methods*, 10, 285–304.
<http://doi:10.1037/1082-989X.10.3.285>
- Mayo, E. (1949). *Hawthorne and the western electric company*.
- McLeary, C., & Cruise, P. (2012). Modeling Organisational Trust: Addressing Challenges of Measurement Invariance. In *Proceedings of the 11th European Conference on Research Methods (p. 470)*. Academic Conferences Limited.
- Morin, E.-M. (1998). *Psychologies au travail*. Montréal: Gaëtan Morin.
- Parks, L., & Guay, R. P. (2009). Personality, values, and motivation. *Personality and Individual Differences*, 47(7), 675–684.
<http://doi.org/10.1016/j.paid.2009.06.002>

- Paulhus, D. L. (1991). Measurement and control of response bias. In J. P. Robinson, P. R. Shaver, L. S. Wrightsman, J. P. Robinson, P. R. Shaver, & L. S. Wrightsman (Eds.), *Measures of personality and social psychological attitudes* (pp. 17–59). San Diego, CA, US: Academic Press.
- Pearson, K. (1895). Contributions to the Mathematical Theory of Evolution. II. Skew Variation in Homogeneous Material. *Philosophical Transactions of the Royal Society of London: Mathematical, Physical and Engineering Sciences*, 186, 343–414. <http://doi.org/10.1098/rsta.1895.0010>
- Ros, M., Schwartz, S. H., & Surkiss, S. (1999). Basic individual values, work values, and the meaning of work. *Applied Psychology*, 48(1), 49–71.
- Sass, R., Frick, S., Reips, U.-D., & Wetzel, E. (2018). Taking the test taker's perspective: Response process and test motivation in multidimensional forced-choice versus rating scale instruments. *Assessment*, 25, 1–13. <http://doi:10.1177/1073191118762049>
- Saville, P., & Willson, E. (1991). The reliability and validity of normative and ipsative approaches in the measurement of personality. *Journal of Occupational Psychology*, 64, 219–238. <http://doi:10.1111/j.2044-8325.1991.tb00556.x>
- Schwartz, S. H. (1992). Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. *Advances in Experimental Social Psychology*, 25(1), 1–65.
- Schwartz, S. H. (1994). Are there universal aspects in the structure and contents of human values? *Journal of Social Issues*, 50(4), 19–45.
- Schwartz, S. H. (2006). Les valeurs de base de la personne : théorie, mesures et applications. *Revue française de sociologie*, 47(4), 929. <http://doi.org/10.3917/rfs.474.0929>
- Schwartz, S. H., & Rubel, T. (2005). Sex differences in value priorities: Cross-cultural and multimethod studies. *Journal of Personality and Social Psychology*, 89(6), 1010–1028. <http://doi.org/10.1037/0022-3514.89.6.1010>
- Steiger, J. H., & Lind, J. C. (1980). Statistically based tests for the number of common factors. In *annual meeting of the Psychometric Society, Iowa City, IA*, 758.
- Stewart, G. L., Darnold, T. C., Zimmerman, R. D., Parks, L., & Dustin, S. L. (2010). Exploring how response distortion of personality measures affects individuals. *Personality and Individual Differences*, 49, 622–628. <http://doi:10.1016/j.paid.2010.05.035>

- Thill, E. E., & Vallerand, R. J. (1993). *Introduction à la psychologie de la motivation*. Editions Etudes Vivantes.
- Thurstone, L. L. (1927). A law of comparative judgment. *Psychological Review*, 79, 273–286.
- Thurstone, L. L. (1931). Rank order as a psychological method. *Journal of Experimental Psychology*, 14, 187–201.
<http://doi:10.1037/h0070025>
- Wils, T., Luncasu, M., & Waxin, M.F. (2007). Développement et validation d'un modèle de structuration des valeurs au travail. *Relations industrielles*, 62(2), 305.
<http://doi.org/10.7202/016090ar>
- Wetzel, E., Böhnke, J. R., & Brown, A. (2016). Response biases. In F. T. L. Leong, D. Bartram, F. M. Cheung, K. F. Geisinger, & D. Iliescu (Eds.), *The itc international handbook of testing and assessment* (pp. 349–363). New York, NY, US: Oxford University Press, Oxford
- Zumbo, B. D., & Thomas, D. R. (1997). A measure of effect size for a model-based approach for studying DIF. Prince George, Canada: Edgeworth Laboratory for Quantitative behavioural Science, University of Northern British Columbia.

CONTACT US

Client Service: customer@centraltest.com

Training and Consulting: consulting@centraltest.com



www.centraltest.com

*Central Test – Empowering Talent © 2021
All rights reserved*