

talentoday



Technical Manual

Table of Contents



Introduction	03
Purpose and Development	03
General Overview of the Questionnaire's Properties	04
Conceptual Background of the Questionnaire	04
Introduction to Psychological Measurements	04
Definitions of Personality Dimensions	06
Theoretical Background of Personality Dimensions	07
Definition of Motivations Dimensions	09
Theoretical Background of the Motivation Dimensions	09
Questionnaire Format	12
Validation Studies	13
US Sample Description	13
Construct Validity	14
Confirmation of Factor Structure	14
Dimensions Inter-correlations	17
Reliability	18
Norms	20
Group Comparisons	22
Gender Differences	22
Age Differences	24
Interpreting the Assessment	26
Personality Results	26
Motivations Results	27
Behaviors Results	28
FAQ Section	40
References	42

Introduction

With all of the quickly evolving technology that surrounds us, it is easy to lose sight of the human aspect that goes into recruiting and understanding people. A person is much more than their previous experience, job title or education. By leveraging the right tools and technology, we can learn so much more about the person behind the resume.

MyPrint® is an online questionnaire used to explore the soft skills of an individual. This assessment provides insights about people's personality, motivations, values, and behaviors, in order to identify the potential that lies within every individual.

With so many tools available at our fingertips, it is essential to ensure that the tools we are using are scientifically valid and sound. This document will go into detailing the science behind the MyPrint® assessment, including its development, theoretical background, dimensions definitions, reliability and validity, and results interpretation.

Purpose and Development

The test editor company Talentoday created the mYti assessment in 2012, a fast and easy-to-take questionnaire which includes 128 questions evaluating personality and motivations in order to provide a comprehensive 'soft-skills' profile for each user. This profiling tool was designed as a generic developmental instrument, originally tested on graduates entering the career market and then applied in a broader professional context. Talentoday has progressively gathered over 3.5 million users in more than 160 countries.

MyPrint® is the next generation of the mYti tool, and it is narrowed down to more relevant and usable information about an individual. In summary, the MyPrint® instrument assesses 13 dimensions of personality and 11 dimensions of motivations, for capturing a total of 26 different personality aspects and 22 different motivational triggers. Further combinations of these personality aspects and motivational triggers are made and analyzed in order to predict currently 3 professional types of behavior.

At the end of the journey, this soft-skill evaluation is intended to improve career success by helping individuals identifying their strengths and potential development areas, through the delivering of dedicated insights based on psychometrics and predictive analytics.

The MyPrint® Assessment was created by Gabriel Lasne (Chief Science & Innovation at Talentoday, Msc degree in Cognitive Science, Ph.D candidate in Neuroscience). Reliability and Validity studies were conducted by Gabriel Lasne and Anna Brown (Senior Lecturer in Psychological Methods and Statistics at Kent University, Ph.D in Psychometrics).

MyPrint® has a bright future ahead as the questionnaire is being localized and translated into languages such as French and Spanish, together with new features and enhancements being researched and developed. Different segments including cognitive ability testing, hard skills assessments, and many more options will make it a one-stop-shop for clients and consumers!

General Overview of the Questionnaire's Properties

The general characteristics of MyPrint® can be summarized as follows:

- Total number of questions: 155 questions (78 questions on personality, 77 questions on motivation).
- Measured dimensions: 13 dimensions of personality & 11 dimensions of motivation.
- Average completion time: 16 minutes (no overall time limit is set) based on the first validation study performed on 991 US participants.
- The MyPrint® assessment is constituted of work-based relevant items partly derived from the IPIP open-source data base (International Personality Item Pool, <http://ipip.ori.org/>).
- Measured dimensions of the questionnaire are based on both:
 - Theories: The Five Factor Model (Costa & McCrae, 1985) for personality items & the Theory of Human Motivation (Maslow, 1943) for motivations.
 - Competency requirements specified by HR managers from international corporations and career advisors from international universities.
- Administration format: Multidimensional binary forced-choice with graded preferences. The forced-choice format guards against social desirability, impression management, moderate responding bias and acquiescence bias. Not only does this format reduce candidates' ability to improve their scores, items are combined in such a manner that it makes it difficult for respondents to conceive a response strategy as each pair is comprised of equally desirable items (Bowen, Martin, & Hunt, 2002; Kluger, Reilly & Russel, 1991).
- Validity and Reliability of the questionnaire have been ensured using state-of-the-art psychometric techniques such as the Thurstonian Item Response Theory (IRT) modelling.
- MyPrint® score type: IRT scores (z-scores) repositioned on a [0-10] scale.
- Additional interpretive dimensions are available: 3 professional behavior profiles derived from the Personality and Motivations dimensions.

Conceptual Background of the Questionnaire

Introduction to Psychological Measurements

Historically, the Latin origin of the word personality (persona) referred to masks worn to represent roles that actors interpreted. Today, the term covers psychological characteristics common to all human beings and is used to explain human nature and individual differences.

Considered the father of psychometrics, Sir Francis Galton (1884) was the first scientist to analyze the structure of personality using a lexical hypothesis. The lexical hypothesis is one of the most widely used underlying theories of personality and rests on two arguments; a) personality characteristics that are most important in people's lives will eventually become a part of their language; and b) more important personality characteristics are more likely to be encoded within language as a single word. Based on this lexical hypothesis, Allport (1937) was the first to use the term "personality" in its modern application and produce an understandable classification of human traits that led to the clustering and later factor structure of personality traits by Cattell (1957) and Costa & McCrae (1985).

In the business world of the 21st century, psychometric measurement tools are increasingly used in the workplace as they help to predict behaviors and performance in a reliable way. In particular, the measurement of personality represents a key component in identifying individuals who are best suited for particular situations, and so must be integral to any process where the individual is central to productivity (Cruise, 2012).

Also, there are two main approaches to classifying individuals in personality psychology: type (Jung, 1921) versus trait (Cattell, 1957) approach. Type theories regard opposing personality aspects as two distinct classes and therefore categorize personality as a set of interrelated elements that reinforce similarities between individuals. Trait theories on the other hand, regard personality aspects as degrees of expression along a continuum.

Trait approaches are commonly recommended over type theories in work assessments, especially for recruitment purposes, as they give a more detailed description of psychological characteristics of an individual and thus are more effective predictors of stable behaviors.

The MyPrint® assessment adopts a trait approach and measures stable personality traits in the workplace.

The relationship between individual values, motivations and behaving at work has also been long documented. Several theories point to the role of motivations in determining an individual's life goals, and in explaining why individuals make decision in certain ways on a day to day basis (Maslow, 1954; Herzberg, 1964; Deci, 1971; Schwartz, 2012).

Motivations influence emotional, social and cognitive forces that trigger behaviors. There exist two types of motivation: Extrinsic and Intrinsic (Deci, 1971). Extrinsic motivation refers to factors external to the individual that influence their beliefs, attitudes, decisions and behaviors. Intrinsic motivation, on the other hand, refers to behaviors that are driven by internal rewards or feelings of personal satisfaction unique to an individual. In the context of work, extrinsic motivators include salary, job perks/benefits, status and work conditions, while intrinsic motivators include recognition, challenging work, purposeful work, achievement and opportunities for personal growth (Herzberg, 1964).

Moreover, there is clear evidence establishing a link between motivation and work performance (Locke et al., 1981; Alonso & Lewis, 2001; Bright, 2007) as well as work retention (Rainlall, 2004).

In this line, the MyPrint® assessment measures motivations as they are essential to determine how individuals are likely to behave at work, the type of tasks that will keep them driven and satisfied, and the work environment they are likely to flourish in.

Definitions of Personality Dimensions

MyPrint® measures 13 personality dimensions with opposing poles (for a total of 26 personality aspects) within the context of work. Assessing personality traits is a valuable approach for understanding people at work because:

- Personality traits correspond to the attitudinal & emotional characteristics underlying people's stable behaviors.
- Personality traits influence how an individual is likely to act, adapt to and function effectively in a given situation.

As it will be described in the next section, the Personality assessment is based on established models of personality – like the 'Five Factor Model' (Costa & McCrae, 1985) and the 'Theory of Psychological Types' (Jung, 1971), as well as documented evidence on the value of personality measurement to organizational effectiveness.

For now, the 13 dimensions of Personality of MyPrint® are briefly defined as:

MyPrint® Personality Dimensions	Definition
Extraversion	The extent to which you interact with others in public.
Empathy	The extent to which you take others' perspectives into consideration.
Dominance	The extent to which you exert power and influence in your interaction with others.
Structure	The extent to which you organize your work and plan your activities.
Abstract-Thinking	The extent to which you think about the possibilities of ideas, actions, and situations.
Perspective	The extent to which you consider the wider future implications of your decisions regarding your projects.
Critical-Thinking	The extent to which you challenge standard ways of thinking or new trends and information.
Self-Esteem	The extent to which you believe in your own abilities.
Ambition	The extent to which you have high professional expectations.
Thoroughness	The extent to which you pay attention to details in your work and perform your tasks with precision.
Grit	The extent to which you try to overcome difficulties in order to achieve your project goals.
Patience	The extent to which you control your own stress in response to unexpected events or others' demands.
Optimism	The extent to which you judge the external world and consider the future in a positive manner.

Theoretical Background of Personality Dimensions

MyPrint® was developed using robust theoretical concepts, practical and relevant work requirements and advanced scientific analyses.

The Personality assessment is mainly based on the Five Factor Model (FFM, Costa & McCrae, 1985) of personality. The latter framework is considered the standard in personality trait measurement as it represents well researched global personality traits. The model is comprised of the following factors: Openness - the extent to which an individual is intellectually curious, has insight and is imaginative; Conscientiousness - the extent to which an individual is reliable, persistent and ambitious; Extraversion - the inclination to be sociable, desiring to be among others, thus requiring excitement and stimulation; Agreeableness - the tendency to be humanistic, cooperative and trusting of others; and Neuroticism - the inclination to feel negative emotions including fear, guilt, sadness and anger.

In addition to the FFM, several established theories were used for the conceptual and practical development of MyPrint®. Other theoretical frameworks include the Theory of Psychological Types (Jung, 1971); the 16 Personality Factors (16PF, Cattell, 1957); the HEXACO Model of Personality (Lee & Ashton, 2004). This combined theoretical approach was adopted in order to ensure conceptual richness, practical pertinence and prevent content restriction that may result from a single model.

In addition, the item bank for the Personality assessment was primarily derived from the consistent item scales of the IPIP (International Personality Item Pool, open-source data base, <http://ipip.ori.org/>), and secondarily reinforced by recruiter surveys and job board analyses. This mix between empirically-based and theoretically-based approaches has resulted in the development of an administrator-friendly, work-relevant, valid assessment that users enjoy taking.

The following table details the MyPrint® Personality dimensions mapped onto corresponding item scales and established theories and frameworks on personality:

DISPLAYED ON NEXT PAGE

MyPrint® Personality Dimensions	Reference Model/Dimension	Reference Item Scale
Extraversion	16PF: Liveliness, Privateness, Social boldness FFM: Gregariousness MBTI: Introversion/Extraversion	IPIP: Introversion; Extraversion; Friendliness; Self-disclosure; Exhibitionism; Self-monitoring.
Empathy	16PF: Warmth, Sensitivity FFM: Warmth, Tender-Mindedness, Altruism	IPIP: Understanding; Nurturance; Pleasantness; Empathic Concern; Responsive Distress; Altruism.
Dominance	16PF: Dominance FFM: Assertiveness, Compliance	IPIP: Dominance; Domineering; Leadership; Dependence.
Structure	16PF: Perfectionism FFM: Order	IPIP: Organization; Methodicalness; Orderliness.
Abstract-Thinking	16PF: Abstractedness FFM: Fantasy, Ideas MBTI: Sensing/Intuition	IPIP: Complexity; Depth; Ingenuity; Insight; Intellectual Openness; Need for Cognition.
Perspective	FFM: Deliberation	IPIP: Perspective; Wisdom.
Critical-Thinking	16PF: Openness to change, Rule-consciousness FFM: Values MBTI: Thinking/Feeling	IPIP: Unconventionality; Judgment; Conformity. Sosu (2013): Critical Thinking Disposition.
Self-Esteem	16PF: Apprehension, Self-reliance FFM: Self-consciousness	IPIP: Self-Confidence; Self-Esteem; Self-Consciousness. Sorensen (2006): Self-Esteem. Fisher (2001): Self-directed Learning Readiness.
Ambition	FFM: Modesty HEXACO: Honesty-Humility	IPIP: Ambition. Desrochers (2000): Career Advancement Ambition Scale.
Thoroughness	FFM: Achievement Striving 16PF: Perfectionism	IPIP: Conscientiousness; Cautiousness; Mastery.
Grit	FFM: Self-discipline	IPIP: Achievement Striving; Diligence. Duckworth (2007): Grit scale.
Patience	16PF: Tension, Emotional stability FFM: Impulsiveness, Vulnerability	IPIP: Toughness; Tranquility; Imperturbability; Impulse Control; Moderation; Calmness; Stability.
Optimism	16PF: Vigilance FFM: Positive emotions, Trust, Anxiety	IPIP: Optimism; Hope; Happiness. Scheier (1994): Life Orientation Test.

Definition of Motivations Dimensions

MyPrint® measures 11 motivations dimensions with opposing poles (for a total of 22 motivational aspects) within the context of work. Assessing motivational traits is a valuable approach for understanding people at work because:

- Motivational traits correspond to the desires and needs triggering, orienting and maintaining an individual's behaviors towards a given objective.
- Motivational traits influence choices and decisions and therefore shed light on what drives an individual to act.

As it will be described in the next section, the Motivations assessment is based on established models of motivations and needs – like the 'Maslow's Hierarchy of Needs' (Maslow, 1954) and the 'Self-Determination Theory' (Deci & Ryan, 2000), as well as documented evidence on the value of motivations measurement to work success and fulfillment.

For now, the 11 dimensions of Motivations of MyPrint® are briefly defined as:

MyPrint® Motivational Dimensions	Definition
Responsibility	The extent to which you seek to be held accountable.
Influence	The extent to which you seek to influence others' opinions and intentions.
Autonomy	The extent to which you wish to control your circumstances.
Competition	The extent to which you seek to outperform others.
Relation	The extent to which you seek to have multiple social contacts.
Excitement	The extent to which you are motivated by thrill.
Belonging	The extent to which you seek to be part of a community.
Challenge	The extent to which you set challenging goals for yourself.
Reward	The extent to which you are motivated by tangible rewards.
Novelty	The extent to which you are motivated by new experiences.
Recognition	The extent to which you seek appreciation from others.

Theoretical Background of the Motivation Dimensions

The MyPrint® Motivations assessment is mainly inspired of the Theory of Human Motivation (Maslow, 1943). Indeed, the latter framework has left a strong legacy in motivational trait measurement.

Maslow theorized that individuals have universal needs or sources of motivation at work, which trigger their decision and action. Needs can be classified in a pyramid to visualize their prioritization order. In the Maslow's Hierarchy of Needs, only the satisfaction of needs at lower levels can elicit needs at the next level. The model is comprised of the following 'stages' in needs: Physiological needs – like hunger, thirst, sleep; Safety and protection needs – like the desire for a home or good insurance; Social needs (love and belonging) - like the desire to be part of a family or a group; Self-esteem needs – like the desire for achievement, competence, appreciation or reputation; and Self-fulfilment needs - the desire to realize oneself through work and commitment.

In addition to the Maslow's Theory of Human Motivation, several other established theories were used for the conceptual and practical development of MyPrint®, with the majority agreeing on three key points: 1) The existence of needs. Individuals feel basic needs which they seek to satisfy. 2) The existence of objectives. Individuals are motivated to act in order to achieve a goal. 3) A motivation is a personal phenomenon. Individuals do not have the same needs or problems nor solve them in the same way.

These other theoretical frameworks include the System of Needs (Murray, 1938); the Two-Factor Theory (Herzberg, 1954); the Needs Theory (McClelland, 1961); and the Self-Determination Theory (SDT, Deci & Ryan, 2000). As for the Personality assessment, this combined theoretical approach was adopted in order to ensure conceptual richness, practical pertinence and prevent content restriction that may result from a single model.

Moreover, the item bank for the Motivations assessment was primarily derived from various motivational item scales validated in psychological research articles, and secondarily reinforced by recruiter surveys and job board analyses.

The following table details the MyPrint® Motivations dimensions mapped onto corresponding item scales and established theories and frameworks on motivations:

DISPLAYED ON NEXT PAGE

MyPrint® Motivations Dimensions	Reference Model/Dimension	Reference Item Scale
Responsibility	Hierarchy of Needs: Self-Actualization (Commitment) Two-Factor Theory: Motivators (Responsibility)	Jensen (1958): Mausley Inventory. Schwartz (1996): Work Values – Prestige. Steers (1976): Needs in work settings scale – Dominance.
Influence	Hierarchy of Needs: Self-Esteem (Reputation) Needs Theory: Power	Schönbrodt (2012): Unified Motive Scales – Power. Steers (1976): Needs in work settings scale – Dominance. Forsman (1996): Earning Self-Esteem Scale.
Autonomy	Hierarchy of Needs: Self-Esteem (Competence) SDT: Autonomy	Breaugh (1985): Work Autonomy Scales. Deci & Ryan (2000): Basic Psychological Need Satisfaction at Work Scale. Van den Broeck (2010): Work-related Basic Need Satisfaction Scale – Autonomy. Steers (1976): Needs in work settings scale – Autonomy.
Competition	Hierarchy of Needs: Self-Actualization System of Needs: Superiority	Beersma (2003): Cooperative/Competitive Strategy Scale. Simmons (1988): Collaboration/Competition Scale. Steers (1976): Needs in work settings scale – Dominance.
Relation	Hierarchy of Needs: Social (Love) SDT: Relatedness Two-Factor Theory: Hygiene Factors – Interpersonal relations	Van den Broeck (2010): Work-related Basic Need Satisfaction Scale – Relation. Schönbrodt (2012): Unified Motive Scales – Intimacy. Deci & Ryan (2000): Basic Psychological Need Satisfaction at Work Scale. Schwartz (1996): Work Values – Social.
Excitement	Hierarchy of Needs: Safety/ Self-Actualization Two-Factor Theory: Hygiene Factors – Working conditions	Zuckerman (1996): Sensation Seeking Scale. Arnett (1994): Inventory of Sensation Seeking. Eysenck (1978): Impulsiveness & Venturesomeness Scale. Barratt (1959): Impulsiveness Scale.
Belonging	Hierarchy of Needs: Social (Belonging) Needs Theory: Affiliation	Schönbrodt (2012): Unified Motive Scales – Affiliation. Deci & Ryan (2000): Basic Psychological Need Satisfaction at Work Scale. Hagerty (1995): A measure of Sense of Belonging.
Challenge	Hierarchy of Needs: Self-Actualization Needs Theory: Achievement Two-Factor Theory: Motivators – Challenge System of Needs: Achievement	Forsman (1996): Earning Self-Esteem Scale – Ambition. Schönbrodt (2012): Unified Motive Scales – Achievement. Steers (1976): Needs in work settings scale – Achievement.
Reward	Hierarchy of Needs: Self-Esteem (Reward, Status) Two-Factor Theory: Hygiene Factors – Salary, Benefits, Status	Teck Hong (2011): The mediating effect of love of money. Fall (2015): Recognition at work scale.
Novelty	Hierarchy of Needs: Self-Actualization System of Needs: Cognizance	Jeong (1997): A cross-cultural application of the Novelty scale. Lauriola (2015): Attitudes towards Ambiguity. Kruglanski (1993): Need for Closure scale. Gonzalez (2016): Understanding the need for Novelty from the perspective of the SDT.
Recognition	Hierarchy of Needs: Self-Esteem (Recognition) Two-Factor Theory: Motivators – Recognition System of Needs: Recognition	Schwartz (1996): Work Values – Prestige/Intrinsic enjoyment scales. Fall (2015): Recognition at work scale.

Questionnaire Format

The MyPrint® questionnaire consists of 155 questions, 78 questions about Personality followed by 77 questions about Motivations. Personality questions are randomized between each other, and the same applies for Motivations questions.

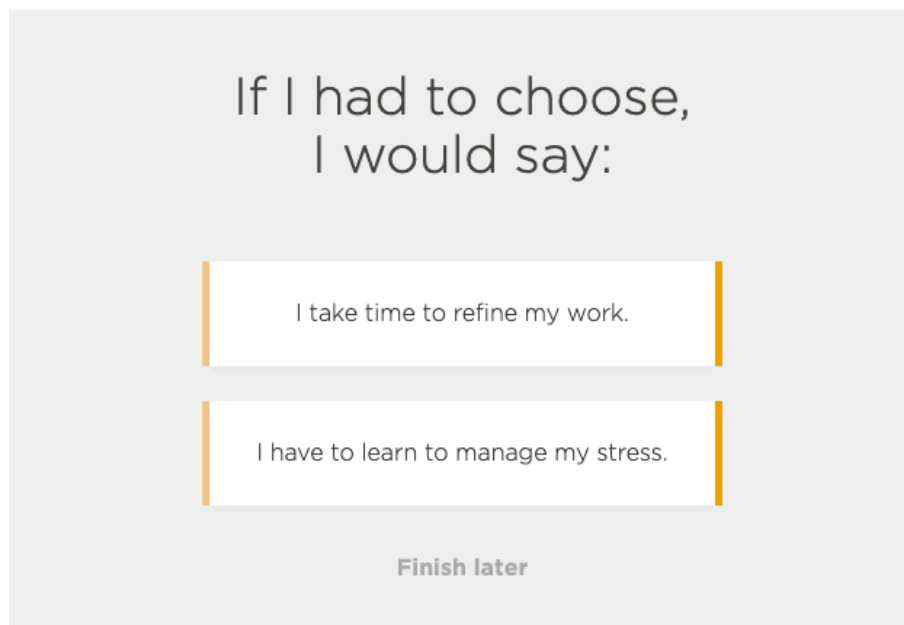
For Personality, 12 items were designed to measure each dimension, with 6 items 'keyed' toward the positive pole of the dimension and 6 items 'keyed' toward the opposite pole. For Motivations, 14 items were designed to measure each dimension, with 10, 11 or 12 items, depending on the dimension, 'keyed' toward the positive pole, and 2, 3 or 4 items 'keyed' toward the opposite pole respectively.

Each question is presented in a binary forced-choice manner, meaning that each question is comprised of 2 statements (pair of items) that require respondents to choose the statement that best suits them. Items are mirrored in pairs so that each of them assesses a different dimension.

In addition, for each question, respondents are also asked to indicate how much they prefer one statement over the other for describing themselves, using 2 ordered categories per statement, namely "A little more like me" or "A lot more like me".

Such an administration format is called "Multi-dimensional binary forced-choice with graded preferences" and is part of the latest advancements in psychometrics applied to questionnaires (Brown & Maydeu-Olivares, 2017).

The following example displays a random question (assessing Motivations) that a user can find in the MyPrint® questionnaire:



If I had to choose,
I would say:

I take time to refine my work.

I have to learn to manage my stress.

Finish later

Traditionally, normative (or rating scales) formats are favored by the psychometric research and are widely used in 'Soft-skills' questionnaires. However, single-stimulus items are subject to numerous response biases such as acquiescence, leniency, extreme and central tendency responding (Van Herk, Poortinga, & Verhallen, 2004), idiosyncratic interpretation of the rating categories (Friedman & Amoo, 1999), halo/horn effects (Murphy, Jako & Anhalt, 1993) and socially desirable responding. These biases can represent a serious inherent threat to validity.

From this perspective, the forced-choice format represents an excellent alternative as it reduces considerably every bias mentioned above, but most of all it prevents respondents from conceiving a response strategy when pairs are comprised of equally desirable items (Bowen, Martin & Hunt, 2002; Kluger, Reilly & Russel, 1991). Moreover, the forced-choice format is known for reducing the likelihood of respondent fatigue, and for improving the quality of the cognitive process regarding decision making (contextual, i.e., closer to real-life) due to the comparative judgement to be made (Kahneman, 2011).

Finally, despite binary preferences have already proven themselves an attractive alternative to ratings, particularly for their resistance to response biases, in the MyPrint® assessment we consider collecting graded preferences for at least two reasons.

First, users often criticize forced-choice formats for the perceived "lack of choice" when presented with items that either all apply to them or none apply. Allowing respondents to indicate the extent of their preference could increase their engagement and the face validity of the questionnaire.

Second, scores derived from binary forced-choice responses generally have lower reliability than scores obtained from ratings (e.g., Likert normative scales) of the same items, because binary responses contain less information inherently. As a result, more items are needed in general in forced-choice questionnaires to reach the same precision of measurement as their (Likert) normative counterparts. The additional information obtained from every comparison by asking participants to quantify the preferences greatly help solving this problem (Brown & Maydeu-Olivares, 2017).

Validation Studies

US Sample Description

The final sample for the US standardization included 991 professionals (347 men; 644 women) ranging in age from 20 to 70 years ($\mu = 41.1$; $\sigma = 12.2$). All participants were native English speakers. The sample was provided via the Amazon Mechanical Turk platform. Participants were invited to take the MyPrint® questionnaire online and received compensation for their participation.

Participants were selected using screening question for professional status. Overall, data was collected from a wide range of industry sectors and job levels: participants represented technical, administrative, service, managerial and nonmanagerial roles and worked for different industries including banking and professional services, marketing and the service sector, manufacturing and product development, information technology, education and research, civil service and non-governmental organizations.

To ensure the quality of data obtained participants who completed the questionnaire in less than 10 minutes were excluded from analyses.

Construct Validity

Validity refers to the extent to which what an assessment claims to measure is well-founded and accurately corresponds to actual measurements. In psychometrics, validity relates to the degree to which practical evidence and scientific theory support the interpretations of test scores.

For Personality and Motivations assessments in the professional context, the Construct Validity is particularly important as it: a) legitimates the standardized measurements of respondents' behaviors, and b) facilitates understanding of organizational implications of findings.

For instance, the Construct Validity of a dimension may be threatened if its construct is: a) defined as too broad or too narrow, b) confounded by other related constructs that mask the effects of the main construct, or d) developed with insufficient research.

For the MyPrint® assessment, Construct Validity was established using two approaches: item response modelling and dimensions inter-correlations.

Confirmation of Factor Structure

Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) are two approaches used to examine the internal robustness of a dimension. Both investigate the theoretical constructs or factors that may be represented by a set of items as well as the quality of individual items (Brown, 2006; Tabachnick & Fidell, 2000). However, whereas the goal of EFA is to identify and maximize the importance (percentage of variance) of each dimension, CFA is a hypothesis driven approach that provides a numerical estimate of the degree to which the proposed factor structure is an accurate fit of the phenomenon in the real world (Schreiber et al., 2006). CFA therefore investigates the degree to which measures of a construct are consistent with established understanding and theoretical arguments for that construct.

However, due to the quasi-dichotomous nature of response options, ipsative (or semi-ipsative) data generated from forced-choice questionnaires under the traditional normative scoring methodology do not lend themselves to standard CFA (Jackson & Alwin, 1980; Baron, 1996; Meade, 2004).

Indeed, in a forced-choice test, the respondent must make a comparative judgement between two or more items to give an answer. Conversely, in a normative test, judgement is viewed in absolute terms for each evaluated dimension. Finally, Classic Test Theory (CTT) scoring method is unable to reflect the psychological process of comparison, leading in most of the cases to distorted ipsative (or semi-ipsative) scores, construct validity and reliability estimates (Cornwell & Dunlap, 1994; Loo, 1999).

In fact, one solution is to change the method of scoring forced-choice questionnaire in order to reflect realistic comparative judgements. Yet, it has represented a long challenge for psychometricians, making forced-choice questionnaires pushed into the background for work-related assessments during decades, despite their tremendous resistance to respondent biases (See section 'Questionnaire format and structure').

Fortunately, to solve the problem of ipsative scoring, researchers progressively relied on the law of comparative judgements from Thurstone (1931), which assigns the result of a comparative judgment to the "relative utility" of objects (or items) compared for each individual.

Recently, an even more precise model has been proposed to model forced-choice data (Brown & Maydeu-Olivares, 2011). In this Thurstonian model, comparative data are embedded in a structural equation modelling framework following the Item Response Theory (IRT) principle. Thus, the model bypasses the estimation of 'latent utility' by directly connecting the choices made by the respondents to the latent dimensions supposed to be measured by the test.

Brown & Maydeu-Olivares (2013) showed that the - IRT- scores provided using this approach were similar to those of a normative test. It is due to the fact that IRT scores are based on Maximum A Posteriori (MAP) likelihood estimators, which take into account the whole response pattern of the respondent. Hence, comparing preferences indicated by the respondent while considering the specific characteristics of each item, allows to deduce (or recover) the absolute (or true) scores of the respondent for each dimension.

In this line, and because the MyPrint® assessment is a multidimensional binary forced-choice questionnaire with 2-graded preferences, its factor structure was established using a Thurstonian IRT model, extended for considering graded preferences (Brown & Maydeu-Olivares, 2017).

Thus, the observed responses to the paired comparisons were encoded into ordinal outcomes according to the following pattern:

$$y_l = \begin{cases} 4, & \text{if item } a \text{ is preferred 'A lot more' than item } b \\ 3, & \text{if item } a \text{ is preferred 'A little more' than item } b \\ 2, & \text{if item } b \text{ is preferred 'A little more' than item } a \\ 1, & \text{if item } b \text{ is preferred 'A lot more' than item } a \end{cases}$$

...where l indicates the pair $\{a, b\}$ and y represents the observed preference decision of the respondent.

For the Personality assessment, a first Thurstonian IRT model was fit to the 78 ordinal outcomes generated from the 78 graded-blocks of paired comparisons, with a proposed structure of 13 - correlated - latent factors (dimensions). For the Motivations assessment, a second Thurstonian IRT model was fit to the 77 ordinal outcomes generated from the 77 graded-blocks of paired comparisons, with a proposed structure of 11 - correlated - latent factors (dimensions). Item parameters (i.e., Factor Loadings or item discrimination, and Thresholds or item difficulty) of both models were estimated from polychoric correlations in the statistical software Mplus 8.1 (Muthén & Muthén, 2017), using the unweighted least squares estimator with robust standard errors (ULSMV).

Finally, the degree to which a proposed model fits the data is one of the most important steps in structural equation modelling (Yuan, 2005).

To assess goodness of fit, we considered:

- The Chi-square/Degrees of freedom (χ^2/df) statistic, indicating the ratio between the power of the model and the amount of error in the data. A good fit is indicated by a small χ^2 value relative to its degrees of freedom (a χ^2/df ratio < 3 is considered as a good indicator) (Kline, 2011).
- The Root mean square error of approximation (RMSEA) with values < .06 indicating good fit (Hu & Bentler, 1999).
- The Standardized root mean square residual (SRMR), which is a direct measure of discrepancy between the observed and model-implied polychoric correlations, with values < .08 indicating good fit (Hu & Bentler, 1999).

As a result, the factor structure that has been initially proposed for the MyPrint® Motivations questionnaire is validated (see Table 1 & 2), while the factor structure that has been initially proposed for the Personality questionnaire suffered only minor adjustments (very few items were removed, few items were switching dimensions, see Table 2) before being validated (see Table 1).

Table 1. Construct Validity indices of the Personality and Motivations assessments of MyPrint®, for the US sample (N = 991).

MyPrint® Framework	χ^2	df	χ^2/df	p	RMSEA	Low 90% C.I.	High 90% C.I.	SRMR
Personality	6834.2	2777	2.46	0	0.038	0.037	0.040	0.060
Motivations	8050.6	2717	2.96	0	0.045	0.043	0.046	0.067

Table 2. Dimensions and number of items per dimension retained in the final factor structures of the Personality and Motivations assessments of MyPrint®, for the US sample (N = 991).

MyPrint® Personality Dimensions Retained	Number of Items Retained	MyPrint® Motivations Dimensions Retained	Number of Items Retained
Extraversion	13	Responsibility	14
Empathy	12	Influence	14
Dominance	11	Autonomy	14
Structure	9	Competition	14
Abstract-Thinking	12	Relation	14
Perspective	11	Excitement	14
Critical-Thinking	12	Belonging	14
Self-Esteem	12	Challenge	14
Ambition	10	Reward	14
Thoroughness	12	Novelty	14
Grit	13	Recognition	14
Patience	11		
Optimism	10		

Dimensions Inter-Correlations

Inter-correlations between dimensions help determining the degree to which certain dimensions are related to a common, established underlying construct. Dimensions that are theoretically and empirically related should generate higher correlation scores. Similarly, dimensions that are not proven to be linked together should generate lower correlation values.

The correlation coefficient (Pearson, 1895) is a numerical way to quantify the relationship between two variables and ranges between -1 and 1. The closer the value is to 1, the stronger is the relationship.

For now, we report only inter-correlations between dimensions belonging to the same framework (i.e., Personality or Motivations) (see Tables 3 & 4).

TABLES 3 & 4 DISPLAYED ON NEXT PAGE

Table 3. Inter-correlations between the MyPrint® Personality dimensions for the US sample (N=991).

		P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13
P1	Critical-Thinking	1												
P2	Ambition	-0.513***	1											
P3	Empathy	-0.333***	-0.249***	1										
P4	Thoroughness	0.23***	-0.206**	-0.013	1									
P5	Abstract-Thinking	0.562***	-0.333***	0.015	-0.083	1								
P6	Patience	-0.192***	0.33***	-0.236***	0.338***	-0.404***	1							
P7	Self-Esteem	0.073	0.597***	-0.514***	0.237***	-0.239***	0.717***	1						
P8	Extraversion	-0.271***	0.613***	0.002	-0.019	-0.272***	0.339***	0.493***	1					
P9	Perspective	0.284***	-0.541***	-0.035	0.538***	-0.143**	0.032	-0.066	-0.337***	1				
P10	Grit	-0.088	0.201**	0.063	0.667***	-0.381***	0.603***	0.437***	0.3***	0.308***	1			
P11	Dominance	0.504***	0.156*	-0.596***	-0.222***	0.211**	-0.145*	0.408***	0.089	-0.215***	-0.327***	1		
P12	Structure	-0.112	-0.203**	-0.077	0.516***	-0.447***	0.13*	-0.014	-0.127**	0.719***	0.455***	-0.296***	1	
P13	Optimism	-0.268***	0.722***	-0.272***	0.24***	-0.452***	0.823***	0.872***	0.539***	-0.087	0.593***	0.028	0.078	1

*Correlations significant at the .05 level, two-tailed.

**Correlations significant at the .01 level, two-tailed.

***Correlations significant at the .001 level, two-tailed. Bold indicates high correlations.

Table 4. Inter-correlations between the MyPrint® Motivations dimensions for the US sample (N=991).

		P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11
P1	Autonomy	1										
P2	Variety	0.143**	1									
P3	Belonging	-0.761***	-0.339***	1								
P4	Recognition	0.297***	-0.184***	-0.148**	1							
P5	Competition	0.327***	0.246***	-0.458***	0.735***	1						
P6	Reward	0.5***	0.033	-0.516***	0.54***	0.531***	1					
P7	Relation	-0.392***	0.025	0.279***	0.106*	0.086	-0.104*	1				
P8	Excitement	0.272***	0.394***	-0.608***	0.231***	0.519***	0.337***	0.361***	1			
P9	Responsibility	0.595***	0.426***	-0.858***	0.321***	0.686***	0.524***	-0.068	0.702***	1		
P10	Influence	0.205***	0.262***	-0.531***	0.466***	0.775***	0.429***	0.214***	0.625***	0.794***	1	
P11	Challenge	0.24***	0.675***	-0.409***	0.005	0.402***	0.399***	-0.184***	0.239***	0.539***	0.408***	1

*Correlations significant at the .05 level, two-tailed.

**Correlations significant at the .01 level, two-tailed.

***Correlations significant at the .001 level, two-tailed. Bold indicates high correlations.

Reliability

Reliability basically refers to the extent to which an assessment is free from measurement error. A good reliability is important for an assessment as it allows to have confidence that the scores derived from the test are really typical of an individual's psychological characteristics. There are several ways to estimate the reliability of a test.

One of the most common methods is the one evaluating the internal reliability or 'consistency'. This is a measure of the degree to which items on a dimension are internally consistent (low variance) and measure the same global dimension.

Conveniently, due to the inherent computations performed by the Thurstonian IRT model (see the section 'Confirmation of Factor Structure'), we have direct access, for each respondent, to the Standard Errors of Measurement (SEM) for each estimated trait (or dimension) scores (IRT scores).

Thus, a common method of summarizing SEM in order to derive an internal reliability estimate for the assessment is to compute the so-called empirical reliability index, which is the ratio of true score variance to the sum of true score and error variance estimated in the sample. As suggested in Du Toit (2003), the true score variance is best estimated directly from the variance of the Maximum A Posteriori (MAP) -IRT-scores while error variance is the mean of the squared SEM estimated for the sample.

Internal reliability values vary from 0 to 1, with higher values more desirable. As a rule of thumb, a reliability of 0.70 or higher is recommended (Nunnally, 1978), with values greater than 0.9 (excellent); 0.7 to 0.9 (good); 0.6 to 0.7 (acceptable); 0.5 to 0.6 (poor) and values less than 0.5 (unacceptable).

As a result, the internal reliability estimates for the MyPrint® Personality and Motivations dimensions are all very good, except for the dimension 'Dominance', for which the internal reliability estimate is just acceptable (see Table 5).

N.B: Please note that an alternative method for estimating the reliability of the MyPrint® assessment would be to evaluate the temporal or 'test-retest' reliability, meaning that we should expect, for each respondent, to have the same results consistently generated over time. Due to time and delay constraints, this particular analysis could not have been performed yet.

Table 5. Internal reliability estimates for the MyPrint® Personality and Motivations dimensions for the US sample (N=991).

MyPrint® Personality Dimensions	Internal Reliability Estimate
Critical-Thinking	0.72
Ambition	0.75
Benevolence	0.80
Thoroughness	0.75
Abstract-Thinking	0.71
Patience	0.82
Self-Esteem	0.82
Extraversion	0.84
Perspective	0.70
Grit	0.84
Dominance	0.68
Structure	0.75
Optimism	0.85

MyPrint® Motivations Dimensions	Internal Reliability Estimate
Autonomy	0.76
Novelty	0.77
Belonging	0.79
Recognition	0.82
Competition	0.81
Reward	0.87
Relation	0.75
Excitement	0.75
Responsibility	0.81
Influence	0.80
Challenge	0.81

Norms

Norms are part of the measurement procedure; they provide the scaling that is needed to assign a value and meaning to the raw scores obtained from an assessment.

Norms help to compare an individual's score on a test with the scores of others who completed the same assessment, usually under similar conditions. These individuals who took the test at the same time are representative of the population for which an assessment is intended and are therefore referred to as the norm group. The closer the match is between the characteristics of the sample and the target population, the more accurate the distribution will be as a ranking guide.

Presently, the norms of the MyPrint® assessment are related to the whole US sample described in the section 'US Sample description' (see Table 6 for details about the norms for the US sample population). The individuals of this sample all share the same native language and culture, two essential factors when it comes to establish norms (Bartram, 2008).

As described earlier (in the section 'Confirmation of Factor Structure'), the output scores from the MyPrint® assessment are the Maximum A Posteriori scores estimated by the Thurstonian IRT model for each dimension of the questionnaire.

Crucially, these scores correspond to z-scores, typically ranging from -3 to +3, and so they are already standardized with respect to the US sample population.

Nonetheless, in order to improve their readability, these z-scores have been repositioned on a scale from 0 to 10 with 5 as a theoretical average using the following formula:

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

N.B: Please note that we do not use the more familiar sten scores in order to preserve the continuous distribution as well as the interval-equivalence of z-scores (IRT scores).

Table 6. Distribution of the MyPrint® assessment scores for the US sample population (N=991).

MyPrint® Dimensions	Mean	SD	Skewness
Personality			
Critical-Thinking	4.594	1.484	0.185
Ambition	5.675	1.333	-0.283
Benevolence	5.968	1.589	-0.192
Thoroughness	4.847	1.588	0.153
Abstract-Thinking	4.531	1.510	0.283
Patience	5.254	1.633	-0.130
Self-Esteem	5.118	1.384	-0.166
Extraversion	4.811	1.849	-0.190
Perspective	4.739	1.400	-0.005
Grit	4.879	1.553	0.149
Dominance	4.452	1.408	0.267
Structure	4.614	1.706	0.120
Optimism	5.692	1.498	-0.298
Motivations			
Autonomy	4.740	1.610	0.400
Novelty	5.038	1.463	0.497
Belonging	4.673	1.468	-0.161
Recognition	4.596	1.350	0.111
Competition	4.891	1.444	0.082
Reward	4.535	1.608	0.308
Relation	5.128	1.363	-0.077
Excitement	4.738	1.454	-0.017
Responsibility	4.816	1.388	0.131
Influence	4.748	1.403	0.087
Challenge	4.598	1.552	0.598

Skewness indicates the extent to which a distribution deviates from symmetry around the mean. A value of zero means the distribution is symmetric, a positive value indicates a greater number of smaller values, and a negative value indicates a greater number of larger values. A skewness value of +/- 1 is considered very good for most psychometric uses, but +/- 2 is also usually acceptable. As can be seen in the table, the MyPrint® assessment scores have skewness within +/- 1, suggesting that the distributions of the scores are very close to being symmetrical.

Group Comparisons

Group comparisons on MyPrint® dimensions scores were conducted for Gender, and Age on the whole US sample (see the section 'US Sample description').

The comparisons followed effect size conventions suggested by Cohen (1988): small, 0.2, medium, 0.5 and large, 0.8. For practical applications, a medium effect is defined here as equal to or larger than 0.5 sten ($d=0.25$) and a large effect as equal to or exceeding 1.5 sten ($d=0.75$). Rounding these stens would result in 1 sten for a medium effect and 2 stens for a large effect. Effects smaller than 0.5 sten are considered as having little practical impact.

Gender Differences

Gender differences were compared for each dimension of the MyPrint® assessment. Effects sizes are given with a positive value indicating that women have a higher score compare to men.

Gender differences were found on a number of dimensions (see Table 7). The magnitude of these differences is typically small (below one sten), yet medium for a couple of dimensions.

The largest differences were found for Self-Esteem (effect size of -0.68), Benevolence (0.66), Patience (-0.55) and Optimism (-0.52).

TABLE 7 DISPLAYED ON NEXT PAGE

Table 7. Gender differences on the MyPrint® dimension scores for the US sample population (N=991). Absolute effect sizes are considered as below:

Small: 0.2–0.5		Medium: 0.5–0.8		Large: > 0.8			
MyPrint® Dimensions	Female			Male			Effect Size
	Weighted %	Mean	SD	Weighted %	Mean	SD	
Personality							
Critical-Thinking	65	4.512	1.457	35	4.747	1.522	–0.159
Ambition	65	5.509	1.283	35	5.985	1.370	–0.362
Benevolence	65	6.319	1.537	35	5.316	1.475	–0.662
Thoroughness	65	4.836	1.558	35	4.869	1.643	–0.021
Abstract-Thinking	65	4.508	1.505	35	4.575	1.517	–0.045
Patience	65	4.953	1.565	35	5.814	1.609	–0.545
Self-Esteem	65	4.805	1.309	35	5.698	1.333	–0.678
Extraversion	65	4.716	1.849	35	4.986	1.836	–0.146
Perspective	65	4.784	1.389	35	4.655	1.416	0.092
Grit	65	4.837	1.523	35	4.957	1.605	–0.077
Dominance	65	4.271	1.389	35	4.789	1.381	–0.374
Structure	65	4.706	1.719	35	4.443	1.669	0.154
Optimism	65	5.427	1.446	35	6.184	1.468	–0.520

Small: 0.2–0.5		Medium: 0.5–0.8		Large: > 0.8			
MyPrint® Dimensions	Female			Male			Effect Size
	Weighted %	Mean	SD	Weighted %	Mean	SD	
Motivations							
Autonomy	65	4.636	1.550	35	4.933	1.699	–0.185
Novelty	65	4.865	1.386	35	5.360	1.547	–0.343
Belonging	65	4.823	1.392	35	4.396	1.563	0.294
Recognition	65	4.557	1.382	35	4.670	1.287	–0.084
Competition	65	4.748	1.447	35	5.157	1.402	–0.286
Reward	65	4.440	1.588	35	4.712	1.631	–0.169
Relation	65	5.117	1.350	35	5.147	1.387	–0.022
Excitement	65	4.568	1.398	35	5.053	1.503	–0.338
Responsibility	65	4.651	1.327	35	5.123	1.446	–0.345
Influence	65	4.611	1.394	35	5.002	1.386	–0.281
Challenge	65	4.432	1.469	35	4.905	1.652	–0.308

Age Differences

Correlations between age and dimension scores of the MyPrint® assessment were small (see Table 8). Across all dimensions, the average absolute correlation was 0.09. The largest correlation with age was found for Grit (0.19), indicating older people rated themselves as more determined compared to younger people. All correlations above 0.03 are significant at $p < 0.001$ as a result of the large sample size.

Mean differences in dimension scores of the MyPrint® assessment were also examined by converting age into two groups: over 40 and under 40 (see Table 9). Effects sizes are given with a positive value indicating that individuals below 40 have a higher score compared to those above 40. Overall, the magnitude of differences is typically small (below one sten). The largest differences were found for Thoroughness (effect size of -0.34) and Grit (-0.32).

Table 8. Correlations with age for the US sample population (N=991).

MyPrint® Dimensions	Correlation Coefficient	MyPrint® Dimensions	Correlation Coefficient
Personality		Motivations	
Critical-Thinking	0.003	Autonomy	-0.021
Ambition	-0.005	Novelty	0.019
Benevolence	0.031	Belonging	0.055
Thoroughness	0.177	Recognition	-0.152
Abstract-Thinking	-0.133	Competition	-0.133
Patience	0.178	Reward	-0.151
Self-Esteem	0.129	Relation	-0.079
Extraversion	0.177	Excitement	-0.150
Perspective	0.116	Responsibility	-0.061
Grit	0.188	Influence	-0.082
Dominance	-0.064	Challenge	0.013
Structure	0.103		
Optimism	0.134		

TABLE 9 DISPLAYED ON NEXT PAGE

Table 9. Age differences on the MyPrint® dimension scores for the US sample population (N=991). Absolute effect sizes are considered as below:

Small: 0.2–0.5		Medium: 0.5–0.8		Large: > 0.8			
MyPrint® Dimensions	Below 40			Above 40			Effect Size
	Weighted %	Mean	SD	Weighted %	Mean	SD	
Personality							
Critical-Thinking	54	4.496	1.527	56	4.710	1.423	–0.145
Ambition	54	5.722	1.392	56	5.620	1.259	0.076
Benevolence	54	5.931	1.574	56	6.012	1.606	–0.051
Thoroughness	54	4.603	1.575	56	5.135	1.555	–0.340
Abstract-Thinking	54	6.614	1.545	56	4.434	1.460	0.120
Patience	54	5.046	1.673	56	5.500	1.548	–0.281
Self-Esteem	54	4.971	1.412	56	5.291	1.331	–0.232
Extraversion	54	4.560	1.811	56	5.106	1.849	–0.299
Perspective	54	4.609	1.459	56	4.891	1.312	–0.202
Grit	54	4.656	1.570	56	5.142	1.490	–0.316
Dominance	54	4.476	1.445	56	4.424	1.364	0.036
Structure	54	4.513	1.772	56	4.733	1.618	–0.130
Optimism	54	5.559	1.539	56	5.849	1.432	–0.195

Small: 0.2–0.5		Medium: 0.5–0.8		Large: > 0.8			
MyPrint® Dimensions	Below 40			Above 40			Effect Size
	Weighted %	Mean	SD	Weighted %	Mean	SD	
Motivations							
Autonomy	54	4.762	1.588	56	4.714	1.634	0.029
Novelty	54	5.010	1.492	56	5.072	1.428	−0.043
Belonging	54	4.614	1.502	56	4.742	1.424	−0.087
Recognition	54	4.763	1.313	56	4.400	1.368	0.271
Competition	54	5.047	1.460	56	4.707	1.404	0.237
Reward	54	4.724	1.628	56	4.313	1.556	0.258
Relation	54	5.233	1.403	56	5.004	1.303	0.169
Excitement	54	4.916	1.501	56	4.529	1.367	0.269
Responsibility	54	4.881	1.430	56	4.739	1.334	0.103
Influence	54	4.835	1.445	56	4.645	1.346	0.136
Challenge	54	4.568	1.583	56	4.633	1.514	−0.042

Interpreting the Assessment

The MyPrint® questionnaire results are reported in the MyPrint® One-Pager. This report is separated into 3 segments: Personality Summary, Motivations, and Behaviors. In other words, the results of the MyPrint® assessment outline how to best understand, motivate, and manage individuals.

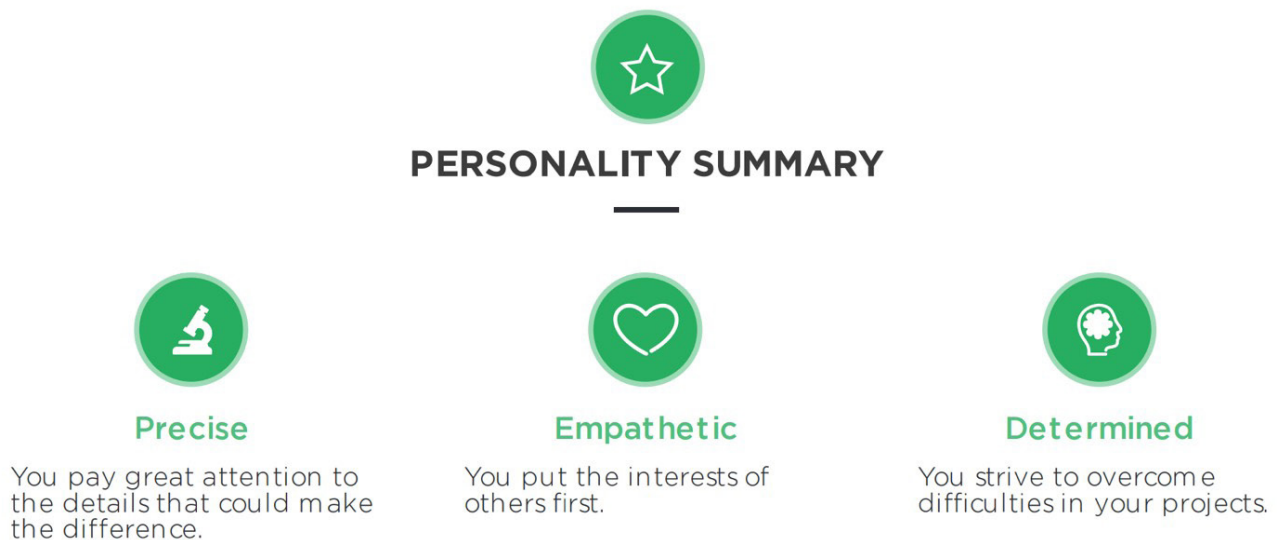
The following sections will detail each of the 3 segments mentioned above.

Personality Results

The Personality results summary of MyPrint® help in understanding the characteristics that make up how an individual tend to think and feel.

The MyPrint® One-Pager displays the 3 personality aspects that are the most distinct for an individual. Each of these personality aspects correspond to one pole of the 13 personality dimensions described in the section 'Definitions of Personality dimensions'.

Specifically, we computationally select the 3 personality dimensions out of the 13 available for which the individual has scores that are the furthest from the average scores on these dimensions in the norm sample (described in the section 'Questionnaire Structure and Validity'). In other words, we report the 3 personality aspects and their definitions that are best used to describe the Personality of an individual (see the example below):



Motivations Results

The Motivations results of MyPrint® help in understanding the reasons an individual has for acting or behaving in a particular way.

The MyPrint® One-Pager displays the 3 motivators that are the most distinct for an individual. Each of these motivators correspond to one pole of the 11 motivations dimensions described in the section 'Definitions of Motivations dimensions'. Specifically, we computationally select the 3 motivations dimensions out of the 11 available for which the individual has scores that are the furthest from the average scores on these dimensions in the norm sample (described in the section 'Questionnaire Structure and Validity'). In other words, we report the 3 motivators and their definitions that are best used to describe the Motivations of an individual (see the example below):



TOP MOTIVATORS

1

Need to contribute to society

You desire to put your efforts into the service of others.

2

Need to cooperate

You seek to share and exchange your knowledge with others.

3

Need to open up to others' opinions

You need to understand others' opinions in discussions.

Behaviors Results

The Behaviors results of MyPrint® help in understanding the way in which individuals actually act or conduct themselves, especially toward others.

The MyPrint® One-Pager currently displays the 3 predominant behavioral styles of an individual. Overall, we are able to describe 11 behavioral dimensions in the professional context: Communication Style, Conflict Management, Decision-Making, Learning Style, Creativity Style, Leadership Style, Working Style, Team Contribution, Risk-Orientation, Change Reaction and Rule Consciousness.

These behavioral dimensions are analytically derived from behavioral models which have left a strong legacy in various fields of the psychological research, from social psychology to behavioral economics. In these behavioral models, behaviors are typically segmented into 4, 5 or 6 different behavioral types that an individual is susceptible to show in a professional context, depending on their psychological characteristics. In other words, researchers report the main dimensions of personality, motivations and values that correlate the most to the behavioral types.

According to these models, the Behavioral dimensions of MyPrint® are displayed as score matrices resulting from the combination (or crossing) of the regular Personality and Motivations dimensions of the assessment. Therefore, the Behavioral Styles of MyPrint® can be predicted based on the scores (high or low) that an individual has obtained on the Personality and Motivations dimensions crossed together.

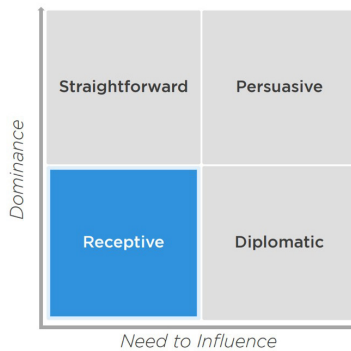
In summary, these analytical grids give insights for understanding why an individual tends to foster a particular pattern of actions and how he/she maintains it.

In the following we define and detail the relationship between the MyPrint® Behavioral dimensions, Behavioral Style, Personality and Motivations dimension, and corresponding established models on behaviors:

- **Communication style** can be summarized as the set of processes by which an individual sends a message to one or many peers, verbally or not.

The Communication style module is derived from the model of the 5 Behavioral Communication Styles (Bourne, 1995).

Specifically, the grid results from the combination of the 'Dominance' dimension in Personality, and the 'Need to Influence' dimension in Motivations (example on next page):



The 4 possible Behavioral styles of Communication are: Straightforward, Persuasive, Receptive, and Diplomatic (see their definitions in the table below).

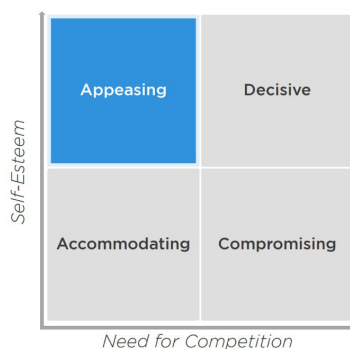
For instance, an individual who has a low score in 'Dominance' (in the inferior half of the scale) and a low score in 'Need to Influence' (in the inferior half of the scale) will be most often 'Receptive in Communication situations.

MyPrint® Behavioral Dimension	MyPrint® Behavioral Styles	Types Definitions
Communication	Straightforward	Individuals who are Straightforward Communicators are inclined to clearly state their ideas while keeping a neutral tone and being respectful of others' views.
	Persuasive	Individuals who are Persuasive Communicators are inclined to dominate others in interactions by openly convincing them to see thing their way.
	Receptive	Individuals who are Receptive Communicators are inclined to speak softly in interactions, and mostly listen to others' points of views in order to please them.
	Diplomatic	Individuals who are Diplomatic Communicators are inclined to control the course of discussions to their advantage by placing underlying messages in their spoken words.

- **Conflict management** can be summarized as the way an individual tries to limit the negative aspects of a confrontation while increasing its positive aspects.

The Conflict management module is derived from the robust model of the Thomas-Kilmann Conflict Mode Instrument (Thomas & Kilmann, 1993).

Specifically, the grid results from the combination of the 'Self-Esteem' dimension in Personality, and the 'Need for Competition' dimension in Motivations (example on next page):



The 4 possible Behavioral styles of Conflict Management are: Appeasing, Decisive, Accommodating, and Compromising (see their definitions in the table below).

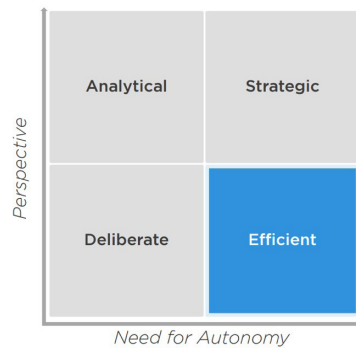
For instance, an individual who has a high score in 'Self-Esteem' (in the superior half of the scale) and a low score in 'Need for Competition' (in the inferior half of the scale) will be most often 'Appeasing' in Conflict situations.

MyPrint® Behavioral Dimension	MyPrint® Behavioral Styles	Types Definitions
Conflict Management	Appeasing	Individuals who are Appeasing in Conflict tend to dig into the underlying concerns and consider the views of others.
	Decisive	Individuals who are Decisive in Conflict tend to settle it by asserting their own solution.
	Accommodating	Individuals who are Accommodating in Conflict put aside their own needs in order to keep the peace with others.
	Compromising	Individuals who are Avoiding in Conflict tend to ignore or withdraw from it rather than facing it.

- **Decision making** can be described as the set of processes, either intuitive or reasoned, by which an individual ends up choosing between two or more courses of actions.

The Decision making module is derived from the model of the 4 Decision-Making Styles (Brousseau, 2006).

Specifically, the grid results from the combination of the 'Perspective' dimension in Personality, and the 'Need for Autonomy' dimension in Motivations (example on next page):



The 4 possible Behavioral styles of Decision-Making are: Analytical, Strategic, Deliberate, and Efficient (see their definitions in the table below).

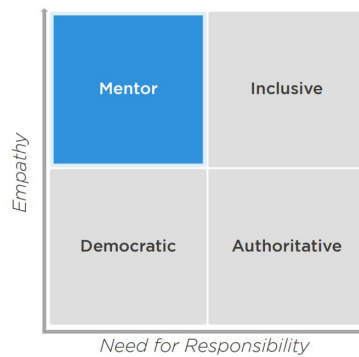
For instance, an individual who has a low score in 'Perspective' (in the inferior half of the scale) and a high score in 'Need for Autonomy' (in the superior half of the scale) will be most often 'Efficient' in Decision-Making situations.

MyPrint® Behavioral Dimension	MyPrint® Behavioral Styles	Types Definitions
Decision Making	Analytical	Individuals who are Analytical Decision Makers tend to consider multiple points of view in order to frame the situation very broadly.
	Strategic	Individuals who are Strategic Decision Makers rely on their own assessment of a great deal of information to build solutions that stand the test of time.
	Deliberate	Individuals who are Deliberate Decision Makers consider just enough input from others to make a plan, but are ready to quickly adapt to the situation if need be.
	Efficient	Individuals who are Efficient Decision Makers value efficiency. They make up their minds and quickly move on to the next decision.

- **Leadership style** can be described as the set of processes by which an individual motivates their peers to contribute toward the effectiveness of their organization.

The Leadership style module is derived from Leadership that get results (Goleman, 2000).

Specifically, the grid results from the combination of the 'Empathy' dimension in Personality, and the 'Need for Responsibility' dimension in Motivations (example on next page):



The 4 possible Behavioral styles of Leadership are: Mentor, Inclusive, Democratic, and Authoritative (see their definitions in the table below).

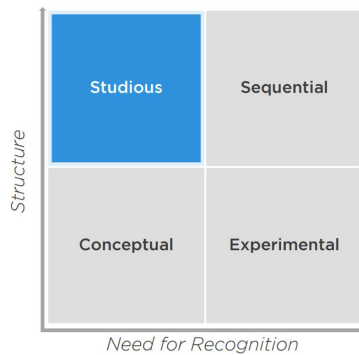
For instance, an individual who has a high score in 'Empathy (in the superior half of the scale)' and a low score in 'Need for Responsibility' (in the inferior half of the scale) will be most often 'Mentor' in Leadership situations.

MyPrint® Behavioral Dimension	MyPrint® Behavioral Styles	Types Definitions
Leadership	Mentor	Individuals who are Mentor Leaders build emotional bonds by empowering others and offering plenty of positive feedback.
	Inclusive	Individuals who are Inclusive Leaders drive necessary changes by mobilizing everyone toward a common vision.
	Democratic	Individuals who are Democratic Leaders guard themselves against backlash by letting others give their inputs upstream.
	Authoritative	Individuals who are Authoritative Leaders tend to demand compliance since they would take full responsibility for issues that may arise.

- **Learning style** can be summarized as the set of processes by which an individual acquires new, or transforms existing, skills or knowledge in a long-lasting manner.

The Learning style module is derived from Learning and teaching styles in engineering education (Felder et al., 1988).

Specifically, the grid results from the combination of the 'Structure' dimension in Personality, and the 'Need for Recognition' dimension in Motivations (example on next page):



The 4 possible Behavioral styles of Learning are: Studious, Sequential, Conceptual, and Experimental (see their definitions in the table below).

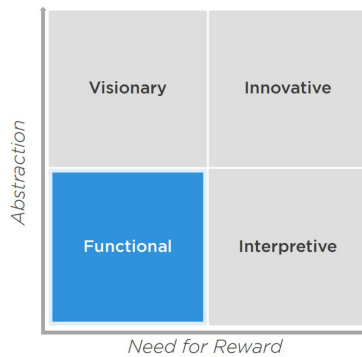
For instance, an individual who has a high score in 'Structure' (in the superior half of the scale) and a low score in 'Need for Recognition' (in the inferior half of the scale) will be most often 'Studious' in Learning situations.

MyPrint® Behavioral Dimension	MyPrint® Behavioral Styles	Types Definitions
Learning	Studious	Individuals who are Studious Learners like learning things for their own sake, through methods that allow time to think of each informative step, such as readings.
	Sequential	Individuals who are Sequential Learners learn best when taught in lesson format, with clear goals to hit and positive feedback validating their progress.
	Conceptual	Individuals who are Conceptual Learners learn for fun, in irregular patterns, and they feel they master a topic only once they understand its full context.
	Experimental	Individuals who are Experimental Learners learn well by doing, especially through group interactions, where they seek to get praised while they are testing their new skills on others.

- **Creativity style** can be described as the set of processes by which an individual produces something new and somehow valuable, be it intangible or concrete.

The Creativity style module is derived from Beyond Big and Little: The Four C Model of Creativity (Kaufman & Beghetto, 2009).

Specifically, the grid results from the combination of the 'Abstract-thinking' dimension in Personality, and the 'Need for Reward' dimension in Motivations (example on next page):



The 4 possible Behavioral styles of Creativity are: Visionary, Innovative, Functional, and Interpretive (see their definitions in the table below).

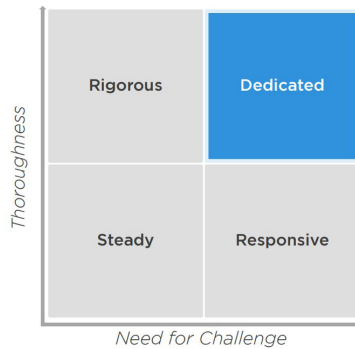
For instance, an individual who has a low score in 'Abstract-Thinking' (in the inferior half of the scale) and a low score in 'Need for Reward' (in the inferior half of the scale) will be most often 'Functional' in Creativity situations.

MyPrint® Behavioral Dimension	MyPrint® Behavioral Styles	Types Definitions
Creativity	Visionary	Individuals who are Visionary Creators aim for groundbreaking changes, such as merging ideas from different domains together to forge unique concepts.
	Innovative	Individuals who are Innovative Creators focus on profitable opportunities to develop new processes or technologies.
	Functional	Individuals who are Functional Creators put their creative mind in everyday activities, through original ways of using some tools or methods.
	Interpretive	Individuals who are Interpretive Creators propose their own, more advanced interpretation of existing techniques or devices.

- **Work style** refers to the way an individual tackles their tasks and projects and to the pace at which they complete them.

The Work style module is derived from Multitasking: Switching Costs (American Psychological Association, 2006).

Specifically, the grid results from the combination of the 'Thoroughness' dimension in Personality, and the 'Need for Challenge' dimension in Motivations (example on next page):



The 4 possible Behavioral styles of Working are: Rigorous, Dedicated, Steady, and Responsive (see their definitions in the table below).

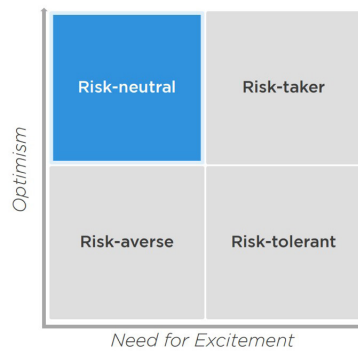
For instance, an individual who has a high score in 'Thoroughness' (in the superior half of the scale) and a high score in 'Need for Challenge' (in the superior half of the scale) will be most often 'Dedicated' in Working situations.

MyPrint® Behavioral Dimension	MyPrint® Behavioral Styles	Types Definitions
Working Style	Rigorous	Individuals who are Rigorous Workers favor serial-tasking in order to ensure providing high quality and error-free products.
	Dedicated	Individuals who are Dedicated Workers provide high quality work that goes above and beyond, even at the cost of potential burn out.
	Steady	Individuals who are Steady Workers emphasize the importance of reliably meeting deadlines, and favor consistent productivity by focusing on bottom-line results.
	Responsive	Individuals who are Responsive Workers favor multi-tasking and the use of shortcuts in order to meet the demand, making them at ease in fast-paced environments.

- **Risk orientation** can be described as the way an individual invests energy in response to perception of significant uncertainty, namely in seeing either the opportunities or the obstacles.

The Risk orientation module is derived from Understanding and Managing Risk Attitude (Hillson & Murray-Webster, 2007).

Specifically, the grid results from the combination of the 'Optimism' dimension in Personality, and the 'Need for Excitement' dimension in Motivations (example on next page):



The 4 possible Behavioral styles of Risk Orientation are: Risk-neutral, Risk-taker, Risk-averse, and Risk-tolerant (see their definitions in the table below).

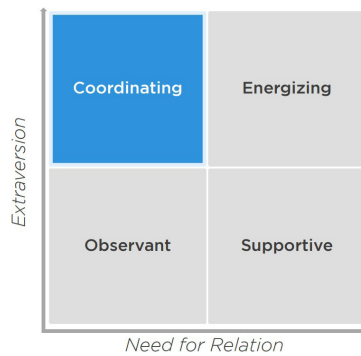
For instance, an individual who has a high score in 'Optimism' (in the superior half of the scale) and a low score in 'Need for Excitement' (in the inferior half of the scale) will be most often 'Risk-neutral' in Risky situations.

MyPrint® Behavioral Dimension	MyPrint® Behavioral Styles	Types Definitions
Risk–Orientation	Risk–neutral	Individuals who are Risk–neutral strive to minimize their uncertainty by searching for the most rational solution.
	Risk–taker	Individuals who are Risk–takers expect positive outcomes from risky opportunities, making them typically go for them in order to maximize the gains.
	Risk–averse	Individuals who are Risk–averse focus on negative outcomes in risky opportunities, which typically makes them avoid them and choose safe alternatives.
	Risk–tolerant	Individuals who are Risk–tolerant are open to deal with risky situations as long as they can determine solutions that reduce their potential losses.

- **Team contribution** can be summarized as the way an individual cooperates with others in group settings, in order to achieve organization objectives.

The Team contribution module is derived from People Styles at Work and Beyond – Making Bad Relationships Good and Good Relationships Better (Bolton & Bolton, 2009).

Specifically, the grid results from the combination of the 'Extraversion' dimension in Personality, and the 'Need for Relation' dimension in Motivations (example on next page):



The 4 possible Behavioral styles of Team contribution are: Coordinating, Energizing, Observant, and Supportive (see their definitions in the table below).

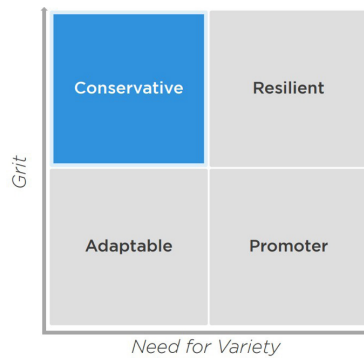
For instance, an individual who has a high score in 'Extraversion' (in the superior half of the scale) and a low score in 'Need for Relation' (in the inferior half of the scale) will be most often 'Coordinating' in Team meeting situations.

MyPrint® Behavioral Dimension	MyPrint® Behavioral Styles	Types Definitions
Team Contribution	Coordinating	Individuals who are Coordinating teammates expect efficiency, focus on goals and coordinate people together.
	Energizing	Individuals who are Energizing teammates get excited and draw others in with enthusiasm, while showing a relatively short attention span.
	Observant	Individuals who are Observant teammates focus on content, and are likely to ask others about their expectations regarding their role in the process.
	Supportive	Individuals who are Supportive teammates are loyal team players, by actively listening, discussing and defending the different views of others.

- **Change reaction** can be described as the typical response of an individual to the unexpected events or situations arising in their environment of work.

The Change reaction module is derived from Personal traits, emotions, and attitudes in the workplace: Their effect on managers' tolerance of ambiguity (Katsaros & Nicolaidis, 2012).

Specifically, the grid results from the combination of the 'Grit' dimension in Personality, and the 'Need for Variety' dimension in Motivations (example on next page):



The 4 possible Behavioral styles of Change reaction are: Conservative, Resilient, Adaptable, and Promoter (see their definitions in the table below).

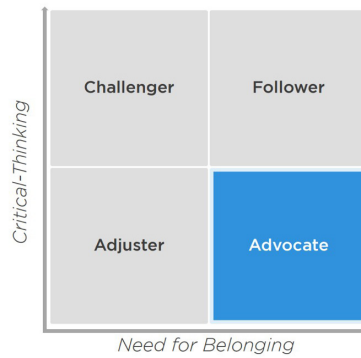
For instance, an individual who has a high score in 'Perspective' (in the superior half of the scale) and a low score in 'Need for Autonomy' (in the inferior half of the scale) will be most often 'Conservative' in Change situations.

MyPrint® Behavioral Dimension	MyPrint® Behavioral Styles	Types Definitions
Change Reaction	Conservative	Individuals who are Conservative needs to be convinced of the necessity of changes prior to overcoming them.
	Resilient	Individuals who are Resilient tend to recover from changes by finding new ways of reaching their initial goals.
	Adaptable	Individuals who are Adaptable quickly adapt to changes occurring in processes, since they may represent an opportunity to adjust their goals.
	Promoter	Individuals who are Change Promoters enjoy celebrating new events, and they typically welcome, support and even sometimes initiate changes at work.

- **Rule consciousness** can be summarized as the way an individual interprets, judges and reacts to the organizational rules in place.

The Rule consciousness module is derived from Your New Job: Disruptor (Linkner, 2012).

Specifically, the grid results from the combination of the 'Critical-Thinking' dimension in Personality, and the 'Need for Belonging' dimension in Motivations (example on next page):



The 4 possible Behavioral styles of Rule consciousness are: Challenger, Follower, Adjuster, and Advocate (see their definitions in the table below).

For instance, an individual who has a low score in 'Critical-Thinking' (in the inferior half of the scale) and a high score in 'Need for Belonging' (in the superior half of the scale) will be most often 'Advocate' regarding organizational Rules.

MyPrint® Behavioral Dimension	MyPrint® Behavioral Styles	Types Definitions
Rule Consciousness	Challenger	Individuals who are Challengers evaluate rules and norms in place with great objectivity, and might choose their own way of doing things.
	Follower	Individuals who are Followers go along with rules, as it is a way for them to feel connected to others.
	Adjuster	Individuals who are Adjusters are likely to try to bend the rules they strongly disagree with, or to turn them to their advantage.
	Advocate	Individuals who are Advocates show a strong respect for authority, and promote the existing rules or norms of any organization they belong to.

FAQ Section

What is the MyPrint® assessment?

MyPrint® is a psychometric tool used to assess individuals through a questionnaire that evaluates personality and motivations. With a total of 155 questions, the assessment takes an average of 16 minutes to complete.

What is the MyPrint® Assessment measuring?

The MyPrint® Assessment has questions to measure an individual's Personality and Motivations. The Behaviors in the final report are derived from an individual's Personality and Motivations.

Can I retake the assessment?

Yes. You can retake the MyPrint® assessment every six months. We ask you wait 6 months between assessments in order to offer you reliable and accurate results. If you take the questionnaire several times within a short period of time, a learning bias may affect your results. We encourage users to retake the assessment every six months to discover how they have grown and how their professional motivations have evolved.

Why do I have to choose between two answers? Sometimes both/neither answer fits me.

We know that it can be tough to make a choice between two statements that are equally fitting or that do not apply to you. It is normal that you sometimes feel frustrated: you would like to choose both phrases, or neither phrase fits you. Still, keep choosing the phrase that describes you the closest, and remember you also indicate your degree of preference towards a particular statement. For instance, if in a particular pair neither answer seems to fit you, then you can choose the sentence that suits you the closest and select the option 'A little more like me' to indicate your little degree of preference. The latter indication will be fully considered while computing your Personality or Motivations profile. Finally, please note that this forced-choice approach with graded preferences is currently one of the most efficient way to accurately evaluate your personality and motivations (cf. section 'Questionnaire format').

What is reliability and why is it important?

Reliability refers to the precision of an assessment. Basically, reliability describes the extent to which an assessment is free from error. There are several ways to estimate the reliability of a test. One of the most common methods is the one evaluating the internal reliability or 'consistency'. This is a measure of the degree to which items on a dimension are internally consistent and measure the same global dimension. In other words, this is a measure of the error part of each item of the questionnaire. One example of this is if you were to step on your scale at home and it said you weighted 150lbs at a precision of ± 50 lbs, that would not be a reliable scale. In the same way, if someone were to take the MyPrint® assessment including sentences that do not precisely relate to their supposed dimensions, then the assessment would not be a reliable assessment.

What is validity and why is it important?

Validity describes whether an assessment is measuring what it claims to measure. One of the most common forms of validity for an assessment like MyPrint® is "Construct" Validity. This describes how well the items on an assessment measure each dimension that it claims to be measuring (i.e., personality and motivation dimensions). For example, if you were to step on your scale at home and it told you your age, that would not be a valid scale, since the purpose of the scale is to tell you your weight. In the same way, if someone were to take the MyPrint® assessment, which measures the construct of personality and motivation, but were asked math questions, then the assessment would not be measuring what it is meant to measure.

As detailed in the above report, MyPrint® has gone through a reliability and validity study, and has been proven to be a valid assessment. Ongoing testing and research is being done on the MyPrint® assessment to ensure even more precise reliability and validity reporting.

How do you know that the information you gather is accurate and actually measures this correctly?

This is referring to the validity of an assessment. MyPrint® is rooted in widely accepted psychological theory (Five Factor Model, Maslow's Hierarchy of Needs, Herzberg's Two-Factor Theory) and has been reviewed by field expert, Anna Brown, to measure the construct validity of the assessment. As a result of the analysis that was done, we can conclude that our assessment is valid and the questions asked are representative of the constructs.

When was the last reliability and validity study conducted for the MyPrint™ Assessment, and how many individuals participated?

MyPrint® is undergoing constant data collection for reliability and validity studies. The most recent reliability and validity study was conducted in August 2018.

Why are my results not reflective of me?

Your MyPrint® results are 100% based on how you responded to the questionnaire. Some reasons why your results might seem inaccurate are: distractions while completing the questionnaire, rushing through the questionnaire, trying to force a certain outcome, or low self-awareness/blind spots.

References

- Allport, G. W. (1937). *Personality: a psychological interpretation*. H. Holt and Company.
- Alonso, P., & Lewis, G. B. (2001). Public Service Motivation and Job Performance Evidence from the Federal Sector. *The American Review of Public Administration*, 31(4), 363-380.
- Arnett, J. J. (1994b). Sensation seeking: A new conceptualization and a new scale. *Personality and Individual Differences*, 16, 280-296.
- Barratt, E. E. (1959). Anxiety and impulsiveness related to psychomotor efficiency. *Perceptual and Motor Skills*, 9(2), 191-198.
- Baron, H. (1996a). Strengths and limitations of ipsative measurement. *Journal of Occupational and Organizational Psychology*, 69(1), 49-56.
- Bartram, D. (2008). Global Norms? Towards some guidelines for aggregating personality norms across countries. *International Journal of Testing*, 8, 315-333.
- Beersma, B., Hollenbeck, J. R., Humphrey, S. E., Moon, H., Conlon, D. E., & Ilgen, D. R. (2003). Cooperation, Competition, and Team Performance: Toward a Contingency Approach. *Academy of Management Journal*, 46(5), 572-590.
- Bolton R. & Bolton D. G. (2009). *People Styles at Work and Beyond – Making Bad Relationships Good and Good Relationships Better*. New York: American Management Association (2nd ed.).
- Bourne, E. J. (1995). *The Anxiety and Phobia Workbook*. 2nd edition. New Harbinger Publications, Inc. pp 297.
- Bowen, C., Martin, B. A., & Hunt, S. T. (2002). A comparison of ipsative and normative approaches for ability to control faking in personality questionnaires. *The International Journal of Organizational Analysis*, 10(3), 240-259.
- Breaugh, J. A. (1985). The measurement of work autonomy. *Human Relations*, 38(6), 551-570.
- Bright, L. (2007). Does Person-Organization Fit Mediate the Relationship Between Public Service Motivation and the Job Performance of Public Employees? *Review of Public Personnel Administration*, 27(4), 361-379.
- Brown, A., & Maydeu-Olivares, A. (2011). Item response modeling of forced-choice questionnaires. *Educational and Psychological Measurement*, 71(3), 460-502.

Brown, A., & Maydeu-Olivares, A. (2013). How IRT can solve problems of ipsative data in forced-choice questionnaires. *Psychological Methods*, 18(1), 36-52.

Brown, A., & Maydeu-Olivares, A. (2017): Ordinal Factor Analysis of Graded-Preference Questionnaire Data. *Structural Equation Modeling: A Multidisciplinary Journal*, 25(4), 516-529.

Brown, T. A. (2006). *Confirmatory Factor Analysis for Applied Research*, First Edition (1 edition). New York: The Guilford Press.

Cattell, R. B. (1957). *Personality and Motivation Structure and Measurement*. New York: World Book.

Cornwell, J. M., & Dunlap, W. P. (1994). On the questionable soundness of factoring ipsative data: A response to Saville & Willson (1991). *Journal of Occupational and Organizational Psychology*, 67(2), 89-100.

Costa, P. T., & McCrae, R. R. (1985). *The NEO Personality Inventory manual*. Odessa, FL: Psychological Assessment Resources.

Cruise, P. A. (2012). The stability and organisational value of personality assessment. *Psyche Magazine* Vol 64, Spring, pp 14-15.

Deci, E. L. (1971). Effects of externally mediated rewards on intrinsic motivation. *Journal of Personality and Social Psychology*, 18, 105-115.

Deci, E. L. & Ryan, R. M. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55, 68-78.

Desrochers, S., & Dahir, V. (2000). Ambition as a motivational basis of organizational and professional commitment: Preliminary analysis of a proposed Career Advancement Ambition Scale. *Perceptual and Motor Skills*, 91(2), 563-570.

Du Toit, M. (Ed.). (2003). *IRT from SSI*. Lincolnwood, IL: SSI.

Duckworth, A. L., Peterson, C., Matthews, M. D., & Kelly, D. R. (2007). Grit: Perseverance and passion for long-term goals. *Journal of Personality and Social Psychology*, 92, 1087-1101.

Eysenck, S. B., & Eysenck, H. J. (1978). Impulsiveness and venturesomeness: Their position in a dimensional system of personality description. *Psychological Reports*, 43(3, Pt 2), 1247-1255.

Fall, A. (2015). Reconnaissance au travail : Validation d'une échelle de mesure dans le contexte des entreprises. *Revue européenne de psychologie appliquée/European Review of Applied Psychology*, 65, 189-203.

- Felder, R. M. & Silverman, L. K. (1988). Learning and teaching styles in engineering education. *Engineering Education*, 78(7), 674–81.
- Forsman, L., & Johnson, M. (1996). Dimensionality and validity of two scales measuring different aspects of self-esteem. *Scandinavian Journal of Psychology*, 37(1), 1-15.
- Fisher M, King J, Tague G (2001). Development of a self-directed learning readiness scale for nursing education. *Nurse Educ Today*, 21(7), 516–525.
- Friedman, H., & Amoo, T. (1999). Rating the rating scales. *Journal of Marketing Management*, 9, 114-123.
- D. Goleman. (2000). Leadership that get results. *Harvard Business Review*.
- González-Cutre, D., Sicilia, A., Sierra, A. C., Ferriz, R., & Hagger, M. S. (2016). Understanding the need for novelty from the perspective of self-determination theory. *Personality and Individual Differences*, 102, 159–169.
- Hagerty, B. M. K., & Patusky, K. (1995). Developing a measure of sense of belonging. *Nursing Research*, 44(1), 9-13.
- Herzberg, Frederick (1964). "The Motivation-Hygiene Concept and Problems of Manpower". *Personnel Administrator* (27): 3–7.
- Hillson D. & Murray-Webster R. (2007). *Understanding and Managing Risk Attitude*. Gower Publishing, Ltd.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1–55.
- Jackson, D. J., & Alwin, D. F. (1980). The Factor Analysis of Ipsative Measures. *Sociological Methods & Research*, 9(2), 218–238.
- Jensen, A. R. (1958). The Maudsley personality inventory. *Acta Psychologica*, 14, 314-325.
- Jeong, S.-O., & Park, S.-H. (1997). A Cross-Cultural Application of the Novelty Scale. *Annals of Tourism Research*, 24(1), 238-240.
- Jung, C. G. (1921). *Psychologische Typen*. Zürich: Rascher.
- Jung, C. G. (1971). *Psychological Types*. Routledge, Vol. 6.
- Kahneman, D. (2011). *Thinking, fast and slow*. New York: Farrar, Straus and Giroux.

Katsaros, K. K. & Nicolaidis, C. S. (2012). Personal traits, emotions, and attitudes in the workplace: Their effect on managers' tolerance of ambiguity. *The Psychologist-Manager Journal*, 15(1), 37-55.

Kaufman J. C. & Beghetto R. A. (2009). Beyond Big and Little: The Four C Model of Creativity. *Review of Global Psychology*.

Kline, R. B. (2011). *Principles and Practice of Structural Equation Modeling*. Guilford Press.

Kluger, A. N., Reilly, R. R., & Russell, C. J. (1991). Faking biodata tests: Are option-keyed instruments more resistant? *Journal of Applied Psychology*, 76(6), 889-896.

Kruglanski A. W., Webster D. M., & Klem A. (1993). Motivated resistance and openness to persuasion in the presence or absence of prior information. *Journal of Personality and Social Psychology*, 65, 861–876.

Lauriola, M., Foschi, R., Mosca, O., and Weller, J. (2015). Attitude toward ambiguity: empirically robust factors in self-report personality scales. *Assessment* 23, 353–373.

Lee, K., & Ashton, M. C. (2004). Psychometric Properties of the HEXACO Personality Inventory. *Multivariate Behavioral Research*, 39(2), 329-358.

Linkner J. (2012). Your New Job: Disruptor. *Forbes*.

Locke, E. A., Shaw, K. N., Saari, L. M., & Latham, G. P. (1981). Goal setting and task performance: 1969–1980. *Psychological Bulletin*, 90(1), 125-152.

Loo, R. (1999). Issues in factor-analyzing ipsative measures: The Learning Style Inventory (LSI-1985) example. *Journal of Business and Psychology*, 14(1), 149-154.

Maslow, A. H. (1943). A theory of human motivation. *Psychological Review*, 50(4), 370-396.

Maslow, A. H. (1954). *Motivation and personality*. New York: Harper.

McClelland, David C. 1961. *The achieving society*. Princeton, N.J.: Van Nostrand.

Meade, A. W. (2004). Psychometric problems and issues involved with creating and using ipsative measures for selection. *Journal of Occupational and Organizational Psychology*, 77(4), 531-552.

Multitasking: Switching Costs. (2006). American Psychological Association.

Murphy, K. R., Jako, R. A., & Anhalt, R. L. (1993). Nature and consequences of halo error: A critical analysis. *Journal of Applied Psychology*, 78, 218-225.

Muthén, L. K., & Muthén, B. O. (2017). *Mplus User's Guide (Eighth Edition)*. Los Angeles, CA: Muthén & Muthén.

Murray, Henry A (1938). *Explorations in Personality*. Oxford University Press.

Nunnally, J. C. (1978). *Psychometric theory*. New York: McGraw-Hill.

Pearson, K. (1895). Contributions to the Mathematical Theory of Evolution. II. Skew Variation in Homogeneous Material. *Philosophical Transactions of the Royal Society of London A: Mathematical, Physical and Engineering Sciences*, 186, 343-414.

Rainlall, S. (2004). A review of employee motivation theories and their implications for employee retention within organizations. *The journal of American academy of business*, 9, 21–26.

Scheier, M. F., Carver, C. S., & Bridges, M. W. (1994). Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): A re-evaluation of the Life Orientation Test. *Journal of Personality and Social Psychology*, 67, 1063-1078.

Schönbrodt, F. D., & Gerstenberg, F. X. R. (2012). An IRT analysis of motive questionnaires: The Unified Motive Scales. *Journal of Research in Personality*, 46, 725–742.

Schreiber, J. B., Nora, A., Stage, F. K., Barlow, E. A., & King, J. (2006). Reporting Structural Equation Modeling and Confirmatory Factor Analysis Results: A Review. *The Journal of Educational Research*, 99(6), 323-338.

Schwartz, S. H. (1996). Value priorities and behavior: Applying a theory of integrated value systems. *The psychology of values: The Ontario Symposium* (Vol. 8, pp. 1-24). Hillsdale, NJ: Erlbaum.

Schwartz, S. (2012). An Overview of the Schwartz Theory of Basic Values. *Online Readings in Psychology and Culture*, 2(1).

Simmons, C. H., Wehner, E. A., Tucker, S. S. and King, C. S. (1988). The cooperative/competitive strategy scale: A measure of motivation to use cooperative or competitive strategies for success. *Journal of Social Psychology*, 128: 199–205.

Sorensen, M. J. (2006). *Breaking the chain of low self-esteem*. New York: Wolf Publishing Company.

Sosu, E. M. (2013). The development and psychometric validation of a Critical Thinking Disposition Scale. *Thinking Skills and Creativity*, 9, 107-119.

Steers, R.M. and Braunstein, D.N. (1976). A behaviorally based measure of manifest needs in work settings. *Journal of Vocational Behavior* (9:2), pp. 251-266.

Tabachnick, B. G., & Fidell, L. S. (2000). *Computer-Assisted Research Design and Analysis* (1st éd.). Needham Heights, MA, USA: Allyn & Bacon, Inc.

Teck Hong, T. and Amna, W. (2011): Herzberg's motivation-hygiene theory and job satisfaction in the malaysian retail sector: the mediating effect of love of money. Published in: Asian Academy of Management Journal, Vol. 16, No. 1 (15. January 2011): pp. 73-94.

Thomas, K. W. & Kilmann, R. H. (1993). Developing a forced-choice measure of conflict-handling behaviour: the "MODE" instrument. Educational and Psychological Measurement, Vol. 37, No. 2 (1977), pages 309-325.

Thurstone, L. L. (1931). Multiple factor analysis. Psychological Review, 38(5), 406 427.

Van den Broeck, A., Vansteenkiste, M., De 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.

Van Herk, H., Poortinga, Y., & Verhallen, T. (2004). Response styles in rating scales: Evidence of method bias in data from six EU countries. Journal of Cross-Cultural Psychology, 35, 346.

Yuan, K.-H. (2005). Fit Indices Versus Test Statistics. Multivariate Behavioral Research, 40(1), 115 148.

Zuckerman, M. (1996). Item revisions in the Sensation Seeking Scale Form V (SSS-V). Personality and Individual Differences, 20(4), 515.