

PVQ

**PERSONALITY AND VALUES
QUESTIONNAIRE**

TECHNICAL MANUAL

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GENERAL OVERVIEW

ADVANTAGES OF PERSONALITY TESTING FOR PERSONNEL ASSESSMENT AND SELECTION

The fact that personality tests became so widely used by employers is explained by that personality tests offer several essential benefits in addition to all other personnel selection and assessment methods (Goffin, Rothstein & Johnson, 1996). The matter of fact is that only psychometric solutions offer personnel decisions the unique advantage of relating psychological features of individuals to other numeric figures of the enterprise. Actually, no other personnel management tool allows for a standardised procedure, where individuals are being scaled on an objective characteristic, quickly and effectively. Rust and Golombok (2009) say: “The advantages of self-report inventories are that they are quick and easy to administer, they can be administered to groups, the scoring is objective and the responses obtained directly from the person being assessed” (Rust & Golombok, 2009, p. 151). At the 10th conference of the International Test Commission in 2016, Anna Brown stated: “Asking people to assess themselves or others on a set of psychological characteristics is by far the most popular method of gathering data in our field. We use this method either because it is the cheapest, or the best there currently exists for measuring the target characteristic.”

Furnham (1992) mentions the following:

- Tests provide numeric information, which allows for an easier comparison of individuals on the same criteria.
- With data-based records, one can trace a person’s development over time.
- Tests give explicit and specific results rather than vague, ambiguous formulations often found in references.
- Good norms demonstrate a candidate’s scores relative to his population.
- Tests eliminate corruption, favouritism, old-boy networks from self-perpetuating.
- Tests are comprehensive in that they cover all of the basic dimensions of personality from which other occupational behaviour patterns derive. A good test battery can give a complete

picture of individual functioning.

- Tests are scientific in that they are soundly empirically based on proven theoretical foundations.
- Tests increase the behavioural conceptual language of those that use them. This gives those who are not trained in personality theory a very useful set of concepts that they can use to identify and distinguish human characteristics in the workplace.
- Empirical data resulting from the tests can be used to settle empirical arguments.
- Tests give testers and test-takers alike, interesting and powerful insights into their own beliefs and behaviours.

Naturally, the named benefits that personality testing offers should not be taken at face value, and all assumptions on testing advantages are true if and only if the tests in use are reliable and valid, that is, their results are stable and reflect reality. Furthermore, even if using reliable and valid personality tests – i.e., such that adequately and consistently assess personality features of the test-takers – it is to be demonstrated that personality plays a role in the performance of any particular job. For that reason, abundant research has been conducted over the last eight decades to find out how exactly and to what extent workplace behaviour is influenced by personality factors. Free from human bias as it may be, it should not be forgotten that no tool is perfect and free from bias at all. That is why when used alone or without proper understanding, personality tests are often found to be such a weak predictor of human behaviour that some fail to find them related to job performance at all (see Morgeson et al., 2007).

THE VALIDITY OF PERSONALITY TESTS

Few know that starting from the year of 1965 and till the early 1990’s, personality tests were considered to be a questionable measure of prediction of human behaviour. The reason is that the prevailing view on the use of personality tests in the workplace was influenced by the paper of Guion and Gottier (1965) who summarized 12 years (1952–1963) of research,

and published it in the *Journal of Applied Psychology* and *Personnel Psychology*. Their conclusions on the use of personality tests in selection contexts were that they do not advocate the use of personality measures in most situations as a basis for making employment decisions about people.

The enactment of the Employee Polygraph Protection Act in the U.S. in 1988 has boosted the use of personality tests as a measure of integrity evaluation in employment settings (Stabile, 2002). This wave, combined with the development of advanced statistical techniques and the adoption of a unified personality taxonomy, i.e., the five-factor model, has led to new efforts in the exploration of personality tests' utility for personnel decisions. In 1991, Barrick and Mount, in their now seminal work that has been cited more than eleven thousand times, meta-analysed 117 validation studies that totalled in a sample size of almost 24,000 participants. Their results allowed to redeem the reputation of personality tests as a valid tool for personnel selection, and their work is considered to be a turning point in the common view on personality tests (Barrick & Mount, 1991).

Following Barrick and Mount's pioneering work, more than a dozen of meta-analytical studies were conducted, and it has been repeatedly found that conscientiousness and emotional stability are consistently related to job performance across all jobs (e.g., Anderson and Viswesvaran 1998; Salgado 1997; Tett et al. 1991). Indeed, it is hard to conceive of a job where it is beneficial to be careless, irresponsible, lazy, impulsive and low in achievement striving (low conscientiousness). Therefore, employees with high scores on conscientiousness should also demonstrate higher performance at work. Similarly, being anxious, hostile, personally insecure and depressed (low emotional stability) is unlikely to lead to high performance in any job. Thus, it is natural to expect that conscientiousness and emotional stability will be positively related to overall performance across jobs. Other personality dimensions were found to significantly predict performance, but in more job-specific context. For example, while agreeableness may be a useful predictor of service orientation and teamwork, extraversion and openness to experience appear to be related to training proficiency (Barrick, Mount & Judge, 2001).

Multiple studies have followed that evidenced the predictive power of specific personality traits as measured by personality tests for specific jobs. For example, Day and Silverman (1989) have shown that personality variables provide additional insight into the prediction of job performance and job commitment of accountants; Sager and Ferris (1986) investigated personality profiles of sales people, and found that 'excellent' performers are distinguished even from the 'good' ones by that excellent sales people were warm, easy going, and cooperative. Personality tests were found to be related to aspects of the job performance of numerous other professions.

In such a way, the modern view of the scientific community on the use of personality questionnaires for employee decisions is that even though not being an absolute measure, it consistently provides additional valid information in contribution of any decisions made about people, and is meaningfully related to job performance, motivation, job satisfaction, leadership, and other work outcomes (Parks & Guay, 2009). Not the least, it became possible to achieve such results thanks to advances in modern psychometrics and advanced modelling techniques (e.g., Brown, 2016).

VALUES AS MODERATORS OF THE PERSONALITY PERFORMANCE RELATIONSHIP AND THE RATIONALE OF THEIR INCLUSION INTO THE PVQ

Findings related to personality-job performance relationship constantly point at the situational specificity in the role certain personality traits play in job performance. That is, not all personality traits are equally predictive of job performance in different roles, and moreover, often personality traits relevant for certain roles has a bigger or smaller contribution to one's job success, depending on third-party variables. That suggests that additional psychological constructs may play a role in the way personality influences workplace behaviour and job performance. In psychology such an effect of third-party variables is called 'moderating effect', and these relationship affecting variables are called 'moderators'.

For example, Kanfer (1991) as well as McCrae & Costa (1996) argue that measures of personality link to work behaviour through motivational constructs; Barrick, Mount, and

Strauss (1993) found autonomous goal setting and goal commitment to influence relationships between conscientiousness and measures of job proficiency. Tett and Burnett (2003) offer an interactionist model of trait activation, and explain how personality qualities may be expressed differently in different conditions and circumstances, some of which may be intrinsic to the person (i.e., inner ‘presses’, such as motives). Sheldon and Elliot (1999) demonstrate that the degree to which stated goals express enduring interests and values is proportional to the effort put into work; Kumar (2012) argues that personal values are directly related to job-commitment. It seems therefore that personal values and motives play a role beyond personality traits in explaining actual behaviour (Dysvik & Kuvaas, 2013).

Rokeach accepted values as general beliefs that have a motivational function (Rokeach, 1967, 1973). In other words, these are our beliefs, opinions and convictions that have the power of

a driving force on us, a force that has a say in our life choices and our most crucial as well as day-to-day decisions. Leaning on Rokeach’s work, Kumar defines values “as guiding principles in life which transcend specific situations, may change over time, guide selection of behaviour and are part of a dynamic system. Values are drivers of behaviour (Rokeach, 1973), including work place behaviour (Schwartz, 1994)” (Kumar, 2012, p. 306). Cropanzano, James, and Citera (1993) summarise and conclude that values help individuals organise their behaviour, and define “Why?” a person performs an activity.

In light of the presented research, it seems to have stated itself that values should (or must?) be taken into account in the assessment of personality, but that is done so surprisingly rarely. Moreover, doing so would allow to broaden the utility of the assessment measure to enable the user to make inferences about person-organisation fit, not only person-job fit, with all the ensuing benefits.

DEVELOPMENT OF THE PVQ

Lead by the need for a measure that covers personality traits and value dimensions, we combined scales from the 15FQ+ and OPPro personality questionnaires with scales from the Values and Motives Inventory. The general approach to the questionnaire development was to maximise its reliability and score variability, while maintaining reasonable test length. For that reason, 5-point Likert scale was used for response format.

SCALES OF THE PVQ

The PVQ is comprised of thirty-five trait and value scales, apart from dedicated and non-dedicated report validation scales - those that account for response style bias and are used to evaluate the validity of each individual report – will be discussed further. The sources for the scales are the 15FQ+ (Psytech, 2000), the OPPro, and the VMI, whereas the scales were chosen with the aim to comprise a single comprehensive personality and values measure.

Table 1. The Scales of the PVQ

	ID		Type	Low Score Interpretation	High Score Interpretation
1	fA	Empathy	Personality Trait	Low scorers are naturally private individuals who prefer friendships of depth and longevity, rather than accumulating a lot of superficial acquaintances.	High scoring individuals have a warm, friendly demeanour and are likely to enjoy the company of others. They are likely to be generous in their interpersonal relationships and attentive to the needs of others.
2	fH	Social boldness	Personality Trait	Low scorers are prone to feel ill-at-ease in social settings and lack social confidence. They are unlikely to make the first move, and may feel discomfort when in the focus of group attention.	With a high level of social confidence, individuals who score high on this scale should come about as confident communicators who enjoy meeting new people, and being at the centre of attention.
3	fQ2	Group-orientation	Personality Trait	Individuals who score low on this scale are very autonomous and self-sufficient. They may not always see the need to keep others informed and may prefer to make their own decisions rather than consult with others.	Individuals who score high on this scale should appreciate making decisions in consultation with others and are likely to seek the input of colleagues before committing themselves to a course of action.
4	fB	Intellectance	Personality Trait	Individuals who score low on this scale lack confidence in their intellectual abilities and may talk themselves out of more intellectually demanding tasks on the grounds that they are beyond them.	Individuals who score high on this scale are extremely confident in their intellectual ability and, as a result, should enjoy working on tasks that offer a high degree of intellectual challenge and stimulation.
5	fE	Assertiveness	Personality Trait	Individuals who score low on this scale dislike confrontation, have a naturally obliging, cooperative nature and may prefer to support others from behind-the-scenes.	Presenting themselves as a very assertive, individuals who score high on this scale are likely to face conflict and adversity head on, they should be happy taking an unpopular stand if necessary
6	fN	Diplomacy	Personality Trait	Individuals who score low on this scale are direct and to the point in their communications. Probably tending to speak first and think later, they may be seen as lacking tact.	High scorers are particularly restrained individuals who monitor their behaviour closely to ensure they do not upset or offend others. Typically, people with this profile think before speaking, yet may struggle to convey the importance of a message in their desire to communicate it tactfully.

	ID		Type	Low Score Interpretation	High Score Interpretation
7	PER	Persuasiveness	Personality Trait	Individuals who score low on this scale are not likely to reveal interest in situations that require to convince individuals or groups.	Confident of their ability to bring others around to their point of view, high scorers are likely to be particularly persuasive speakers who enjoy negotiating with others and influencing their decisions.
8	fL	Trust	Personality Trait	Low scorers are more sceptical than most, they may be slow to trust others until they have evidence of their trustworthiness and/or ability to deliver on a task.	Individuals who score high on this scale are trusting and prepared to give others the benefit of the doubt. They may sometimes over-estimate someone's capability.
9	fF	Enthusiasm	Personality Trait	Low scorers present themselves as naturally sober and serious individuals who have little time for light-hearted entertainment, preferring instead to engage in more serious activities.	Individuals who score high on this scale are likely to seek out excitement and stimulation, and quick to act in response to opportunities that come their way.
10	fG	Conscientiousness	Personality Trait	Individuals who score low on this scale are spontaneous, expedient and may have difficulty adhering to strict procedures.	High scorers are very conscientious and meticulous individuals who are likely to take their work obligations seriously and set high standards for themselves and others.
11	fI	Tender-mindedness	Personality Trait	Low scorers are rarely moved by feelings of beauty, wonderment or awe – adapting rather a functionally practical, no-nonsense approach to life.	Individuals who score high on this scale often respond to situations and events at an intuitive, emotional level; such people are likely to have little interest in working on utterly practical problems.
12	OBJ	Objective thinking	Personality Trait	For individuals who score low on this scale, sentimentality and subjectivity will be paramount and they will place very little value on 'cold', objective analysis.	For individuals who score high on this scale, logic and analysis are pre-eminent and they will try to avoid subjectivity wherever possible.
13	fM	Abstract thinking	Personality Trait	Low scorers are down-to-earth, practical individuals who are more likely to concentrate on ensuring that things work rather than explore how they work.	Individuals who score high on this scale are creative and imaginative. They should have a strong interest in abstract ideas and look beyond the obvious when problem solving.

	ID		Type	Low Score Interpretation	High Score Interpretation
14	fQ1	Radical thinking	Personality Trait	With a highly conventional outlook on life, individuals who score low on this scale are likely to value tried and tested ways of working and avoid change simply for changes sake.	Individuals who score high on this scale value progress innovation and change. They have a strong dislike for what they see as bureaucratic process, and may be ideally suited to working in a role that provides the latitude to work through issues in their own way.
15	fQ3	Self-discipline	Personality Trait	Low scorers have a 'take me as I am' attitude and are likely to be very free-thinking, open-minded individuals.	High scorers are concerned about maintaining their social standing and reputation. As such, they are likely to place considerable value on self-control and self-discipline and take care not to do or say anything that would seem inappropriate
16	LTO	Long-term Orientation	Value	Low scorers are strongly focused on the 'here and now' and consider fulfilling immediate obligations more important than long-term fulfilment.	Individuals who score high on this scale are strongly focused on the future, where they are willing to delay short-term success and gratification in order to prepare for the future
17	DRV	Energy and Drive	Personality Trait	Individuals who score low on this scale do not have much personal drive and energy, and are considerably less enthusiastic about work than most.	Having high levels of drive and activity, individuals who score high on this scale are likely to have sufficient energy and stamina to meet the most demanding work schedules
18	fC	Emotional Stability	Personality Trait	Individuals who score low on this scale may be prone to mood swings, and it may be difficult for them to mask their feelings, and not let their upset, frustration, or anxiety show.	High scorers should be stable, emotionally strong individuals. With sufficient energy to cope with life's challenges, they should be able to take things in their stride and face emotionally demanding situations without showing undue angst.
19	fO	Confidence	Personality Trait	Individuals who score low on this scale are more apprehensive than most, and may not always give themselves credit for their achievements. Likely to be their own worst critics, they may feel considerable self-doubt if required to face new, unexpected challenges and find themselves dwelling on imagined failures and past mistakes.	High scorers are highly confident, self-assured individual who should expect success more than failure when it comes to dealing with life's challenges. Secure and convinced of their abilities, they are unlikely to worry about facing potential challenges or difficulties, yet may lack insight into any personal shortcomings.

	ID		Type	Low Score Interpretation	High Score Interpretation
20	RES	Resilience	Personality Trait	Individuals who score low on this scale are less resilient than most. As a result, they may see some tasks or challenges as being beyond their ability and may not be motivated to persevere in the face of challenges.	Having a strong belief in their ability to face difficulties, individuals who score high on this scale are likely to be quite resilient and strive to overcome setbacks and challenges.
21	CON	Patience	Personality Trait	Low scorers present themselves as very impatient, hard-driving and eager to get things done, and may believe that the only way to ensure something is done properly is to do it themselves.	Individuals who score high on this scale are unlikely to become impatient when trying to get things done. They should find it easy to relax and unwind after a demanding day, yet may come across as being too laid-back.
22	fQ4	Composure	Personality Trait	Low scorers appear as composed individuals who are unlikely to become short-tempered or irritable when things go wrong.	High scorers come about as tense and temperamental individuals who may have little tolerance for petty inconveniences, and become annoyed or irritable when things go wrong.
23	AL TR	Need for Altruism (Interpersonal)	Personality Trait	Low scoring individuals may be somewhat unsympathetic towards those who are less fortunate than themselves and believe that people are better served if they take responsibility for their own lives rather than rely on others for support.	Individuals who score high on this scale rate altruism as being of very high importance. As such, they feel it is very important to be helpful and considerate to those in need and wherever possible will attempt to alleviate their suffering.
24	AF FE	Need for Affection (Interpersonal)	Value Dimension	Low scoring individuals may be somewhat unsympathetic towards those who are less fortunate than themselves and believe that people are better served if they take responsibility for their own lives rather than rely on others for support.	Individuals who score high on this scale rate altruism as being of very high importance. As such, they feel it is very important to be helpful and considerate to those in need and wherever possible will attempt to alleviate their suffering.
25	AF FI	Need for Affiliation (Interpersonal)	Value Dimension	Low scorers tend to be much more self-sufficient with little need for the companionship of others. Tending to prefer solitary pursuits they will be comfortable with their own company.	High scorers require a great deal of contact with others, and will go out of their way to meet people, feeling at their most comfortable when engaged in activities involving other people.

	ID		Type	Low Score Interpretation	High Score Interpretation
26	ACH	Need for Achievement (Extrinsic)	Value Dimension	Individuals who score low on this scale place very low emphasis on achieving difficult and challenging tasks and see very little reason to set themselves demanding standards of work achievement. Given the choice, they will prefer to set their sights at a realistic, attainable level.	High scorers rate achievement as being of over-riding importance. In line with this, they will want to excel in everything they do. People with this profile routinely set themselves difficult targets, finding great satisfaction from succeeding at the most difficult tasks.
27	FIN	Need for Economic Status (Extrinsic)	Value Dimension	Individuals who score low on this scale will see very little point in pursuing further financial gain once they have achieved a comfortable lifestyle. Not in the least materialistic, they will be unimpressed by the sheer accumulation of wealth.	Individuals who score high on this scale place a high value on economic status and wealth and are very likely to be impressed by and aspire to the accumulation of wealth.
28	SAF	Need for Safety (Extrinsic)	Value Dimension	Low scorers express limited concern for safety and security and are risk-takers who are driven to experience life in all its variety. They express a very strong need for stimulation and excitement.	Individuals who score high on this scale express a very strong need for safety and security and may be very concerned about steering clear of situations in which there is an element of risk or danger.
29	COM	Need for Competition (Extrinsic)	Value Dimension	Not at all motivated by competition, individuals who score low on this scale are unlikely to be happy working in competitive environments.	Individuals who score high on this scale are motivated by competition and a desire to win at any cost. As a result, they are likely to enjoy working in highly competitive environments.
30	AE ST	Need for Aesthetics (Extrinsic)	Value Dimension	Individuals who score low on this scale have very little interest in artistic or cultural pursuits and will much prefer to deal with concrete issues.	Individuals who score high on this scale express a very strong appreciation for aesthetics and cultural activities such as art, music and literature and have the view that they are worth following for their own sake.
31	WOR	Work Ethic (Intrinsic)	Value Dimension	The work ethic of individuals who score low on this scale is likely to be significantly weaker than that of most other people. As a result, they are unlikely to fit into working environments that have a long-hours culture, and are likely to prefer	High scorers have a very strong work ethic. They are likely to believe work is quite important and, as a consequence, they would be expected to be much more committed to work than most other people. As a result, they are likely to fit quite well in working environments that have

	ID		Type	Low Score Interpretation	High Score Interpretation
				settings where there is not an excessive amount of work to do and where they are not kept too busy.	a long-hours culture. They are likely to prefer settings where there is a lot to do and where they are kept very busy.
32	MO RA	Moral Values (Intrinsic)	Value Dimension	Low scorers do not particularly believe in a fundamental set of principles, which dictate the way one should live one's life. With no rigid moral code to guide them, they will be more inclined to view their own, and others, behaviour in the light of the circumstances at the time.	For high scorers, truthfulness and personal integrity are of highest importance in living one's life. Having a belief in basic principles of right and wrong, they tend to measure their own, and others, actions in terms of these fundamental principles. Thus, high scorers would conduct their affairs in line with a strict code of moral values and expect those around them to do the same.
33	TR AD	Traditional Values (Intrinsic)	Value Dimension	Low scorers are inclined to challenge existing traditional way of doing things, believing that changes to existing laws and rules are not only possible, but desirable.	High scorers appear as believing that rules and laws are meant to be obeyed and not broken. They will be inclined to maintain the status quo and be firm defenders of all that is traditional.
34	IN DE	Independence (Intrinsic)	Value Dimension	Low scorers are not particularly concerned with putting their own views across, being fairly content to let others have their way. Tending to believe that those in authority are just doing their job they will generally accept the rulings of such people quite happily.	High scorers will believe in standing up for their own views regardless of what others might think. Being committed to their own viewpoint they will treat the views of others with some suspicion, being on their guard against attempts to persuade them to adopt a different position.

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PROFILE VALIDATION SCALES OF THE PVQ

In order to address the limitations of self-report personality tests, which are outlined by numerous authors (e.g., Furnham, 1992; Rust &

Golombok, 2006; etc.), a number of profile validation scales were incorporated in the PVQ. These scales' breakdown is provided in Table 2,

Table 2. Breakdown of Impression Management Scales

Impression Management Scale	Explanation	Interpretation
Social Desirability	The desire to present an unrealistically positive image of oneself.	A score of 8 – 10 may indicate a deliberate attempt to distort results, or that the respondent has an unrealistic self-image. It is important to consider a test taker's motives for answering in a socially desirable way.
Faking Good	Presenting oneself in a favourable light by denying development areas and weaknesses.	Faking Good results generally follow the same pattern as Social Desirability. Use caution when Faking Good is extremely high, but Social Desirability is not high. Take the entire profile of scores into account, as well as the information from the verification interview/feedback session.
Faking Bad	Presenting oneself in an unfavourable light, and admitting to weaknesses or problem areas that do not apply to the individual.	A high score indicates that a respondent may be self-critical. High levels of anxiety or emotional stress can also inflate the scores on Faking Bad. Take the entire profile of scores into account, as well as the information from the verification interview/feedback session.
Infrequency	Infrequency is a measure of inattention, and could be considered an indication that the respondent did not complete the assessment with due thought and consideration.	Raw scores of 10 or more indicate the presence of Infrequency. Verify information against the scale scores and interview/feedback session. High anxiety levels or a lack of understanding may also impact on scores.
Central Tendency	The extent to which a respondent refused to give decisive answers, and instead responded in a non-committal fashion.	A higher score on this scale indicates that a respondent may have been unwilling to answer freely, or that he/she showed signs of indecisiveness when responding. Anxiety or a lack of understanding may also impact this score.

PSYCHOMETRIC PROPERTIES OF THE PVQ

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SAMPLE

The sample consists of 3197 working age males and females who took the test in English in real-life test-settings. All the questionnaires were completed between January 2017 and March 2020. All questionnaires were administered under strictly standardised procedures by individuals trained to the British Psychological Society’s Level B Certificate of Competence in Occupational Testing.

Table 3 provides gender frequencies, and it is seen that these are distributed approximately equally. As indicated in Table 4, the sample’s age

distribution spans over the whole working age range (from 16 to 70), and is broadly representative of the professional working population, with a mean age of 31.5 and 50% of the sample falling within the 27-39 age range. As seen in Fig. 1, the age is distributed roughly equally among genders, whereas Table 4 provides descriptive statistics of age separately for each gender. From table 4 it is seen that women on average are slightly younger than men, and their age distribution is of slightly smaller range.

Table 3. Frequency table: Gender

Gender	Count	Percentage
Male	1677	47.5%
Female	1520	52.5%
Total	3197	100%

Table 4. Descriptive Statistics: Age

Minimum	1st Quartile	Median	Mean	Std. Deviation	3rd Quartile	Maximum	NA's
16	27	33	31.49	11.15	39	70	283

Table 5. Descriptive Statistics: Age by Gender

Gender	Min	1st Quartile	Median	Mean	Std. Deviation	3rd Quartile	Max	NA's
Male	16	28	35	35.69	9.36	42	70	172
Female	17	26	32	33.08	8.66	39	63	111

Table 6. Frequency table: Education by Gender

			Gender		Total
			Female	Male	
Education Level	No Higher Education	Count	258	241	49
		% of Total	8.1%	7.5%	15.6%
	Professional	Count	460	540	1000
		% of Total	14.4%	16.9%	31.3%
	Higher Education	Count	618	676	1294
		% of Total	19.3%	21.1%	40.5%
	NA	Count	184	220	404
		% of Total	5.8%	6.9%	12.6%
Total	Count	1520	1677	3197	
	% of Total	47.5%	52.5%	100%	

As indicated in Table 6, apart from 404 participants (12.6%) whose education level is unknown, 40.5% of the sample possesses higher education degrees, 31.3% of the sample underwent professional training, and 15.6%

possess no higher education.

It is also seen that in each education level, the genders are distributed approximately equally, and no gender is over-represented in each on the education levels.

Table 7. Frequency table: Sector

Sector	Count	Percentage
Local Government	55	1.72%
Other	328	10.26%
Private	1955	61.15%
Public	151	4.72%
State Owned	334	10.45%
NA's	374	11.70%
Total	3197	100%

From Table 7 it is seen that private sector is dominant in the sample, comprising about 60% of it, whereas about 40% of the sample is represented by all other sectors altogether.

working population, with age, sex, and education distribution reflecting that of this population. Private sector being over-represented in our sample what is indicative of the fact that organisations from this sector are the most common to use commercial psychometric tests.

From all the presented above, we conclude that the sample is broadly representative of the

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RELIABILITY AND INTERNAL CONSISTENCY OF THE PVQ SCALES

In order to be able to combine separate test items into a single scale, and return a common scale score based on multiple items, it has to be demonstrated that these items relate to a common underlying psychological construct, such as a psychological trait or a value dimension. The generally accepted statistical procedure used to establish this presumption is the computation of Cronbach's coefficient alpha (Cronbach, 1951), which represents the inter-relationships of all items within a scale, and is also known as the coefficient of internal consistency. Simply put, it

shows to which extent subjects respond in the same way to the set of items included in the scale, i.e., if someone strongly agrees with one item on the scale, we would expect that if the rest of the items pertain to the same underlying trait, the responses of that person to these items would be similar, or, consistent.

Table 8 provides data on basic properties of each of the PVQ scale score distributions, as well as the coefficients of internal consistency thereof. It is seen that the coefficients of internal consistency of the vast majority of the scales are satisfactory. There are two scales, namely, Objective and Abstract thinking, where alpha somewhat lower.

Table 8. PVQ Scale Statistics

Scale Name	Std. Alpha	S.E.	Skewness	Kurtosis
Empathy	0.78	0.06	0.60	0.99
Social boldness	0.73	0.07	0.29	-0.08
Group-orientation	0.74	0.07	0.08	-0.23
Intellectance	0.74	0.06	0.36	0.31
Assertiveness	0.61	0.07	0.08	0.30
Diplomacy	0.65	0.06	0.64	0.83
Persuasiveness	0.74	0.07	0.18	0.05
Trust	0.73	0.06	0.10	-0.18
Enthusiasm	0.64	0.06	0.05	0.22
Conscientiousness	0.79	0.07	0.75	0.96
Tender-mindedness	0.68	0.08	0.29	0.37
Objective thinking	0.55	0.04	0.09	0.52
Abstract thinking	0.53	0.06	0.25	0.78
Radical thinking	0.64	0.06	-0.27	0.15
Self-discipline	0.77	0.07	1.03	2.10
Long-term Orientation	0.74	0.05	0.73	0.67
Energy and Drive	0.72	0.06	0.38	0.51
Emotional Stability	0.75	0.07	0.50	0.06
Confidence	0.72	0.07	0.06	0.05
Resilience	0.66	0.07	0.16	-0.24
Patience	0.77	0.08	0.25	-0.18
Composure	0.72	0.07	0.47	0.32
Altruism (Interpersonal)	0.6	0.07	0.33	0.54

Scale Name	Std. Alpha	S.E.	Skewness	Kurtosis
Affection (Interpersonal)	0.78	0.07	0.37	0.05
Affiliation (Interpersonal)	0.77	0.07	0.30	0.06
Achievement (Professional)	0.64	0.06	0.44	0.68
Economic Status (Professional)	0.77	0.07	0.06	-0.34
Safety (Professional)	0.7	0.06	-0.25	0.09
Competition (Professional)	0.76	0.08	0.15	-0.35
Aesthetics (Professional)	0.78	0.06	0.46	0.10
Work Ethic (Personal)	0.64	0.06	0.28	0.63
Moral Values (Personal)	0.75	0.05	0.99	1.61
Traditional Values (Personal)	0.67	0.06	-0.31	0.12
Independence (Personal)	0.78	0.07	-0.03	0.02
Social Desirability	0.73	0.07	-0.16	-0.19

Known extent of criticism has been directed at the use of coefficient alpha as a measure of reliability (Trizano-Hermosilla & Alvarado, 2016). Therefore, we see it pertinent to relate to the analysis of the reliability of the PVQ scales in more depth. The matter is that in order to make inferences of a scale's reliability by means of coefficient alpha only, a number of assumptions must be met. These assumptions are normality of score distribution, tau-equivalence (i. e., the same

true score for all test items, or equal factor loadings of all items in a factorial model), and uncorrelated errors (the basic assumption of Classical Test Theory that error score of any pair of items is uncorrelated) must be met. In case they are not, alpha may underestimate the reliability of a scale (e.g., Revelle and Zinbarg, 2009; Sijtsma, 2009, 2012; Cho and Kim, 2015; Sijtsma and van der Ark, 2015).

Table 9. Two reliability coefficients of the PVQ scales

Scale Name	Cronbach's alpha	McDonald's omega
Empathy	0.78	0.79
Social boldness	0.73	0.74
Group-orientation	0.74	0.75
Intellectance	0.74	0.74
Assertiveness	0.61	0.62
Diplomacy	0.65	0.66
Persuasiveness	0.74	0.75
Trust	0.73	0.73
Enthusiasm	0.64	0.64
Conscientiousness	0.79	0.79

Scale Name	Cronbach's alpha	McDonald's omega
Tender-mindedness	0.68	0.70
Objective thinking	0.55	0.59
Abstract thinking	0.53	0.56
Radical thinking	0.64	0.65
Self-discipline	0.77	0.78
Long-term Orientation	0.74	0.75
Energy and Drive	0.72	0.72
Emotional Stability	0.75	0.75
Confidence	0.72	0.72
Resilience	0.66	0.66
Patience	0.77	0.78
Composure	0.72	0.73
Altruism (Interpersonal)	0.6	0.62
Affection (Interpersonal)	0.78	0.78
Affiliation (Interpersonal)	0.77	0.77
Achievement (Professional)	0.64	0.66
Economic Status (Professional)	0.77	0.78
Safety (Professional)	0.7	0.71
Competition (Professional)	0.76	0.76
Aesthetics (Professional)	0.78	0.78
Work Ethic (Personal)	0.64	0.65
Moral Values (Personal)	0.75	0.75
Traditional Values (Personal)	0.67	0.67
Independence (Personal)	0.78	0.78
Social Desirability	0.73	0.73

As far as the assumption of tau-equivalence is virtually never met on practice, an alternative coefficient, which is known to be robust to this violation was used. It was proposed by McDonald (1999), and is known as McDonald's ω (omega). It estimates reliability from a factorial analysis framework, and different studies show that it is one of the best alternatives for estimating reliability (e. g. Zinbarg et al., 2005). Table 9 provides the results of the computation of the

McDonald's omega coefficients for each PVQ scale.

Now that we have computed an additional estimate of reliability of the PVQ scales, we can see that in our case alpha did not heavily underestimate reliability, and that the alternative coefficients obtained are close to the widely accepted alphas. In case of the two scales with alphas lower than desired, the discrepancy between the two coefficients is the biggest, yet is

not significant enough to reach acceptable level.

PVQ Scales Discrimination

An important aspect of measurement is the degree to which the questionnaire is able to discriminate between individuals. Ferguson (1949) derived an index of test discrimination, coefficient δ (delta), for psychometric tests, which was extended to polytomous items by Hankins (2007). In fact, the degree to which a measurement instrument is capable of

discerning differences between individuals is a fundamental aspect of measurement theory. A questionnaire that fails to distinguish real differences is unlikely to be valid, and hence discrimination is a necessary but not sufficient condition of validity. The concept 'discrimination' is also referred to as 'discriminatory power', should not be confused with discriminant validity, item discrimination or discriminant functions. Generalised Ferguson δ coefficients of each of the PVQ scales are

Table 10. Discrimination coefficients of the PVQ scales

Scale Name	Ferguson's δG
Empathy	0.95
Social boldness	0.97
Group-orientation	0.97
Intellectance	0.95
Assertiveness	0.96
Diplomacy	0.96
Persuasiveness	0.97
Trust	0.97
Enthusiasm	0.96
Conscientiousness	0.96
Tender-mindedness	0.96
Objective thinking	0.93
Abstract thinking	0.94
Radical thinking	0.95
Self-discipline	0.94
Long-term Orientation	0.95
Energy and Drive	0.95
Emotional Stability	0.97
Confidence	0.97
Resilience	0.96
Patience	0.98
Composure	0.97
Altruism (Interpersonal)	0.96
Affection (Interpersonal)	0.97
Affiliation (Interpersonal)	0.97



Scale Name	Ferguson's δG
Achievement (Professional)	0.95
Economic Status (Professional)	0.97
Safety (Professional)	0.96
Competition (Professional)	0.96
Aesthetics (Professional)	0.96
Work Ethic (Personal)	0.95
Moral Values (Personal)	0.93
Traditional Values (Personal)	0.95
Independence (Personal)	0.95
Social Desirability	0.97

The received coefficients indicate that all PVQ scales have excellent discriminatory power, and that the scores practically obtained by subjects in the sample spread very well over the scores theoretically possible to obtain.

FACTOR ACTOR STRUCTURE OF THE PVQ

As it has been demonstrated by abundant

research, questionnaires that claim to be comprehensive personality assessment instruments follow five-factor structure, and the same is expected from the PVQ. In order to check the viability of such expectation, principal component analysis with varimax rotation was performed. Factor eigenvalues is provided in Table 11 displays the values thereof together with the cumulative percentage of explained variance.

Table 11. Factor eigenvalues and variance explained by a five-factor solution for the PVQ

Value	Eigenvalue	% Total variance	Cumulative Eigenvalue	Cumulative %
1	8.28	24.37	8.28	24.37
2	4.41	12.96	12.69	37.32
3	2.75	8.08	15.44	45.40
4	2.49	7.33	17.93	52.73
5	1.58	4.65	19.51	57.38

It is seen from the plot and the table that five-factor solution is optimal, as after the fifth factor the scree becomes flat, and eigenvalues of those

factors tend to 1. From the table we can see that the percentage total explained variance by a five-factor solution is 57.38%, which is quite good.



Table 12. Factor loadings of each of the PVQ scales

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Trust	0.725	-0.015	0.116	0.203	0.132
Patience	0.693	-0.060	-0.083	0.080	0.179
Emotional Stability	0.504	0.344	-0.207	0.058	0.446
Diplomacy	0.412	0.473	0.080	-0.202	0.181
Independence	-0.808	0.056	-0.057	-0.110	-0.382
Competition	-0.816	0.104	-0.001	-0.153	-0.003
Economic Status	-0.432	0.040	0.053	0.162	0.169
Altruism	0.366	0.229	0.436	-0.004	0.094
Self-discipline	-0.135	0.780	0.163	-0.132	-0.064
Moral Values	-0.089	0.769	0.168	-0.099	-0.073
Conscientiousness	-0.044	0.686	-0.031	-0.097	0.150
Work Ethic	-0.008	0.582	0.024	0.282	0.075
Long-term Orientation	0.154	0.568	-0.077	0.196	0.397
Achievement	-0.277	0.526	0.093	0.146	0.268
Resilience	0.373	0.460	-0.078	0.493	0.107
Composure	0.341	0.422	0.053	-0.092	0.220
Empathy	0.009	0.441	0.494	0.008	0.279
Tender-mindedness	0.034	-0.075	0.855	0.109	0.025
Affection	-0.099	0.124	0.610	-0.166	0.058
Aesthetics	0.055	0.266	0.608	0.200	0.278
Objective thinking	0.015	0.427	-0.550	0.075	0.293
Intellectance	0.118	0.527	0.052	0.497	0.240
Abstract thinking	-0.114	0.245	0.435	0.512	0.099
Radical thinking	0.279	-0.230	-0.009	0.768	0.126
Traditional Values	0.324	-0.349	-0.056	-0.729	0.081
Safety	0.176	-0.084	-0.035	-0.517	-0.263
Assertiveness	-0.042	0.112	-0.279	0.406	0.448
Group-orientation	0.533	-0.059	0.074	-0.018	0.616
Affiliation	0.248	0.099	0.154	0.053	0.853
Social boldness	0.164	0.160	0.078	0.147	0.818
Enthusiasm	0.076	0.070	0.311	0.225	0.634
Persuasiveness	-0.145	0.291	0.108	0.327	0.582
Confidence	0.383	0.197	-0.373	0.118	0.510
Energy and Drive	0.400	0.389	0.053	0.336	0.474

In Table 12, we see how the PVQ scales group together in the obtained solution. Factor 1 included Trust, Patience, Diplomacy, Independence (-), Competition (-), Economic Status (-), and Altruism, which together fall under the concept of Agreeableness. A scale unexpected in this group is Emotional Stability. Factor 2 is comprised of scales that represent aspects of Conscientiousness, namely, Self-discipline, Moral Values, Conscientiousness, Work Ethic, Long-term Orientation, Achievement, Resilience, and Composure.

Scales that pertain to Factor 3 can be related to Neuroticism. They include Empathy, Tender-mindedness, Affection, Aesthetics, and Objective thinking (-). The fact the Empathy fell into this factor can be explained by that as conceptualised in the PVQ, empathy is an emotional rather than cognitive characteristic. As demonstrated by research on empathy, cognitive and emotional empathy are two distinct psychological properties, which are manifested in different behaviours. Specifically, whereas emotional empathy is defined as emotional sensitivity and reactivity to other

people’s emotions, cognitive empathy is described as the ability to view things from another person’s angle, and place oneself in another person’s shoes (e. g., Davis et al., 1987).

The importance of emotional empathy is in that it contributes to the intention to help others, and be considerate of other people, yet the price of it is some degree of emotional hypersensitivity.

Factor 4 includes Intellectance, Abstract thinking, Radical thinking, Traditional Values (-), and Safety (-). These together fall under the concept of Openness to Experience. And finally, the fifth factor’s theme is all about Extraversion, with Assertiveness, Group Orientation, Affiliation, Social Boldness, Enthusiasm, Persuasiveness, Confidence, and Energy and Drive.

In this way, we can see that the structure of the PVQ expresses the five-factor structure widely and universally found in trait-based personality questionnaires, which purport to evaluate personality comprehensively and fully. The obtained solution can serve as evidence of the appropriateness of the PVQ scale combination to form a single personality measure.

GENDER AND AGE DIFFERENCES ON THE PVQ

GENDER DIFFERENCES

Table 13 presents mean scores on the PVQ scales for men and women. The significance of the mean differences between the scores was examined using the t-statistic, with the associated significance levels.

It is known that in large sample size cases, statistical significance can be overestimated, and because of that a measure of effect size –

Cohen’s d – is also provided.

Examination of Table 13 indicates that a number of these mean scores are significantly different for men and women in terms of the t-statistic, but as is indicated by the magnitude of effect size, the absolute differences are negligible to small, with Cohen’s d never reaching the level of 0.4.

Table 13. Differences in mean scale scores between gender groups, their significance, and effect size

Scale	Mean M	Mean F	FSD (pooled)	t-value	p	Effect Size (Cohen's d)	Spearman's ρ
Energy and Drive	15.98	15.99	3.77	-0.09	0.93	0.00	0.96
Social Desirability	18.90	18.87	4.11	0.21	0.83	0.01	0.89
Aesthetics	14.28	14.33	3.98	-0.31	0.76	0.01	0.94
Radical thinking	21.23	21.28	3.75	-0.37	0.71	0.01	1.00
Traditional Values	23.83	23.74	3.84	0.66	0.51	0.02	1.00

Scale	Mean M	Mean F	FSD (pooled)	t-value	p	Effect Size (Cohen's d)	Spearman's ρ
Diplomacy	16.48	16.60	4.03	-0.82	0.41	0.03	0.89
Achievement	17.23	17.03	3.85	1.42	0.16	0.05	0.98
Conscientiousness	16.14	15.90	4.39	1.57	0.12	0.06	0.90
Self-discipline	13.59	13.37	3.53	1.82	0.07	0.06	0.90
Enthusiasm	19.22	18.97	3.77	1.89	0.06	0.07	1.00
Economic Status	16.45	16.76	4.19	-2.09	0.04	0.07	1.00
Moral Values	10.20	9.95	2.84	2.43	0.01	0.09	0.94
Work Ethic	17.27	16.90	3.74	2.84	0.00	0.10	1.00
Long-term Orientation	9.87	10.18	3.07	-2.87	0.00	0.10	1.00
Affiliation	18.34	18.85	4.60	-3.12	0.00	0.11	0.82
Social boldness	15.54	15.99	4.04	-3.18	0.00	0.11	0.94
Abstract thinking	17.76	18.24	3.43	-3.99	0.00	0.14	0.93
Composure	16.77	17.37	4.23	-4.01	0.00	0.14	0.96
Group-orientation	17.95	18.58	4.04	-4.39	0.00	0.16	1.00
Affection	16.04	15.36	4.07	4.68	0.00	0.17	0.94
Trust	21.05	21.84	4.55	-4.90	0.00	0.17	0.86
Emotional Stability	14.36	15.10	4.19	-4.95	0.00	0.18	0.83
Independence	29.59	28.48	6.14	-5.11	0.00	0.18	0.92
Competition	19.75	18.84	4.88	5.23	0.00	0.19	1.00
Confidence	19.91	20.77	4.65	-5.25	0.00	0.19	1.00
Intellectance	14.42	15.10	3.60	-5.31	0.00	0.19	0.96
Safety	23.23	22.35	3.94	6.31	0.00	0.22	0.96
Altruism	20.78	19.87	4.07	6.35	0.00	0.23	0.95
Tender-mindedness	35.05	33.91	4.96	6.50	0.00	0.23	0.97
Patience	22.63	23.84	5.27	-6.51	0.00	0.23	0.98
Persuasiveness	18.68	19.82	4.33	-7.39	0.00	0.26	1.00
Assertiveness	22.30	23.39	4.10	-7.50	0.00	0.27	1.00
Empathy	14.59	13.58	3.72	7.64	0.00	0.27	0.89
Resilience	16.42	17.54	3.96	-7.98	0.00	0.28	0.90
Objective thinking	15.23	16.42	3.31	-10.11	0.00	0.36	0.94

As Wilson (2005) has noted, if the mean differences in test scores across groups is due to real group differences, rather than being due to test bias, it would be expected that the order of the item thresholds will be invariant across the groups even though the absolute level of the items' endorsements will vary between groups. To examine this issue, the rank order of the item means for each scale were compared between men and women by calculating the rank order correlation (Spearman's ρ) of item mean scores. These correlations are reported in the rightmost column of the table. Rank order correlation coefficients appear to be extremely high, suggesting that the rank order of items in each scale is the same (absolutely the same in some scales) in both sex groups.

HOMOGENEITY OF THE PVQ SCALES BY SEX

In order to examine the possibility of gender bias in the PVQ scales, the internal consistency of each of these scales was examined separately for men and women. Table 14 presents alpha coefficients for the PVQ scales, broken down by sex.

Obtained results presented in this table reveal that the alpha coefficients for each of the primary factors are broadly equivalent for both men and women. This demonstrates that these scales do not show any major difference in internal consistency between sexes, indicating the absence of sex bias with regard to their respective item homogeneities.

Table 14. Reliability Coefficients (Alpha) by Gender

PVQ scale	Male	Female
Empathy	0.77	0.8
Social boldness	0.72	0.75
Group-orientation	0.76	0.72
Intellectance	0.74	0.73
Assertiveness	0.59	0.63
Diplomacy	0.63	0.66
Persuasiveness	0.71	0.77
Trust	0.73	0.72
Enthusiasm	0.63	0.65
Conscientiousness	0.79	0.79
Tender-mindedness	0.68	0.68
Objective thinking	0.49	0.58
Abstract thinking	0.55	0.49
Radical thinking	0.64	0.64
Self-discipline	0.78	0.77
Long-term Orientation	0.73	0.76
Energy and Drive	0.72	0.71
Emotional Stability	0.74	0.76
Confidence	0.68	0.75
Resilience	0.69	0.62
Patience	0.78	0.75
Composure	0.71	0.73

PVQ scale	Male	Female
Altruism (Interpersonal)	0.61	0.58
Affection (Interpersonal)	0.76	0.79
Affiliation (Interpersonal)	0.77	0.77
Achievement (Professional)	0.63	0.66
Economic Status (Professional)	0.77	0.77
Safety (Professional)	0.69	0.71
Competition (Professional)	0.77	0.75
Aesthetics (Professional)	0.78	0.78
Work Ethic (Personal)	0.64	0.64
Moral Values (Personal)	0.75	0.75
Traditional Values (Personal)	0.67	0.67
Independence (Personal)	0.79	0.77
Social Desirability	0.73	0.73

Note. Male Sample n=1679; Female Sample n=1521

Values shown in the rightmost column of Table 15 are Spearman's rank order correlations of item means for each of the PVQ scales. All the correlations are high enough as to suggest that the rank order of these items' thresholds

do not vary substantially across sex. This suggests that item bias is unlikely to be accounting for the mean scale score differences between men and women.

Table 15. Mean Scores on the PVQ Scales by Gender

	Male	Female	Rank Order Correlation of Item Means
Empathy	14.59	13.58	0.89
Social boldness	15.54	15.99	0.94
Group-orientation	17.95	18.58	1
Intellectance	14.42	15.1	0.96
Assertiveness	22.3	23.39	1
Diplomacy	16.94	17.11	0.89
Persuasiveness	18.68	19.82	1
Trust	21.05	21.84	0.86
Enthusiasm	19.22	18.97	1
Conscientiousness	16.14	15.9	0.9
Tender-mindedness	34.04	34.02	0.97

	Male	Female	Rank Order Correlation of Item Means
Objective thinking	19.75	19.69	0.94
Abstract thinking	17.76	18.24	0.93
Radical thinking	21.23	21.27	1
Self-discipline	13.59	13.37	0.9
Long-term Orientation	9.87	10.18	1
Energy and Drive	15.98	15.99	0.96
Emotional Stability	14.36	15.1	0.83
Confidence	19.91	20.77	1
Resilience	16.42	17.54	0.9
Patience	22.63	23.84	0.98
Composure	17.01	17.76	0.96
Altruism (Interpersonal)	20.78	19.87	0.95
Affection (Interpersonal)	16.04	15.36	0.94
Affiliation (Interpersonal)	18.34	18.85	0.82
Achievement (Professional)	17.23	17.03	0.98
Economic Status (Professional)	16.45	16.76	1
Safety (Professional)	23.27	22.31	0.96
Competition (Professional)	20.32	19.55	1
Aesthetics (Professional)	14.28	14.33	0.94
Work Ethic (Personal)	17.27	16.9	1
Moral Values (Personal)	10.2	9.95	0.94
Traditional Values (Personal)	20.79	20.75	1
Independence (Personal)	31.08	31.68	0.92
Social Desirability	18.9	18.87	0.89

Note. Male Sample n=1679; Female Sample n=1521

INVARIANCE OF THE LATENT TRAITS BETWEEN GENDER GROUPS

To examine bias in the measurement model, the factor structure of the PVQ was compared for the two genders. If the PVQ is measuring the same latent traits in each of these groups, the factor structures obtained for each group should be invariant. To examine this, the PVQ scale scores were factor analysed (using principal axis factoring) and the resulting loading matrices went

through a factor congruence computation procedure. The factor congruence coefficient (Lorenzo-Seva & ten Berge, 2006) was calculated to compare the factor structure obtained for each gender group. These coefficients varied from 0.95 to 0.99, indicating that the latent traits assessed by the PVQ are invariant across genders.

RELATIONSHIP WITH AGE

Another factor that may play a role in score differences may be age. For that reason,



relationship of PVQ scale scores with age was examined. Pearson's correlation coefficients were computed between age and each of the

PVQ scales, and the results are shown in Table 16 below.

Table 16. The relationship of each PVQ scale score with age

Scale	Pearson's r
Empathy	0.03
Social boldness	-0.04
Group-orientation	-0.09
Intellectance	-0.03
Assertiveness	-0.2
Diplomacy	-0.03
Persuasiveness	-0.04
Trust	-0.1
Enthusiasm	0.06
Conscientiousness	-0.04
Tender-mindedness	-0.03
Objective thinking	-0.07
Abstract thinking	0.08
Radical thinking	-0.05
Self-discipline	-0.02
Long-term Orientation	-0.05
Energy and Drive	-0.09
Emotional Stability	-0.07
Confidence	-0.09
Resilience	-0.11
Patience	-0.16
Composure	0.07
Altruism (Interpersonal)	0.03
Affection (Interpersonal)	0.09
Affiliation (Interpersonal)	-0.04
Achievement (Professional)	-0.07
Economic Status (Professional)	0.06
Safety (Professional)	0.01
Competition (Professional)	0.11
Aesthetics (Professional)	0.01

Scale	Pearson's r
Work Ethic (Personal)	-0.07
Moral Values (Personal)	-0.02
Traditional Values (Personal)	-0.05
Independence (Personal)	-0.09
Social Desirability	-0.07

From Table 16 we see that none of the scales correlates with age, at least in terms of linear correlation. Together with that, breakdown into age groups reveals that a few scales do exhibit some dynamics in mean scores occurring with age. Results of analysis of variance of four age groups are displayed in Table 17. Root mean

standardised size of effect (RMSSE) is interpreted as difference in group means with the consideration of standard deviation. Taking standard deviation values into account, we see that the score differences between age groups are not large enough to consider age as a source of bias in the scores of these scales.

Table 17. ANOVA results with estimates of effect size for four age groups on each of the PVQ scales

Scale	F	p	RMSSE	Mean (total)	SD (total)	Mean (18-25)	Mean (26-34)	Mean (35-44)	Mean (45+)
Independence	54.92	0.00	1.96	29.05	6.11	26.35	28.54	30.01	30.83
Patience	55.33	0.00	1.64	23.18	5.24	25.23	23.83	22.28	21.55
Competition	59.49	0.00	1.63	19.28	4.86	17.15	18.83	19.96	20.95
Assertiveness	69.27	0.00	1.47	22.76	4.10	24.76	23.16	22.03	21.41
Trust	35.06	0.00	1.19	21.46	4.53	23.01	21.75	21.04	20.20
Confidence	27.21	0.00	1.07	20.32	4.60	21.99	20.39	19.78	19.66
Tender-mindedness	15.51	0.00	0.85	34.45	5.00	33.40	34.13	34.84	35.36
Group-orientation	21.44	0.00	0.82	18.25	4.01	19.44	18.43	17.80	17.63
Social Desirability	14.58	0.00	0.69	18.87	4.12	20.02	18.82	18.48	18.67
Affection	13.76	0.00	0.68	15.75	4.05	14.77	15.65	16.00	16.37
Resilience	13.08	0.00	0.64	16.87	3.93	17.87	16.89	16.56	16.47
Enthusiasm	17.03	0.00	0.64	19.07	3.73	18.74	18.70	19.14	20.07
Emotional Stability	15.99	0.00	0.59	14.71	4.16	15.87	14.74	14.24	14.44
Affiliation	8.47	0.00	0.57	18.59	4.59	19.52	18.54	18.17	18.61
Abstract thinking	14.34	0.00	0.57	17.99	3.37	17.31	17.82	18.15	18.67
Economic Status	11.43	0.00	0.56	16.60	4.20	16.56	16.17	16.65	17.49
Composure	10.14	0.00	0.54	17.09	4.23	16.72	16.70	17.34	17.82
Persuasiveness	8.44	0.00	0.53	19.23	4.37	20.04	19.31	18.76	19.15
Aesthetics	9.89	0.00	0.52	14.23	3.94	13.87	13.92	14.38	14.98

Scale	F	p	RMSSE	Mean (total)	SD (total)	Mean (18-25)	Mean (26-34)	Mean (35-44)	Mean (45+)
Social boldness	7.99	0.00	0.49	15.74	4.04	16.54	15.72	15.38	15.74
Energy and Drive	8.15	0.00	0.48	15.92	3.70	16.66	15.93	15.69	15.62
Traditional Values	9.94	0.00	0.45	23.78	3.76	24.46	23.80	23.63	23.41
Altruism	8.98	0.00	0.45	20.32	4.08	19.94	19.95	20.74	20.71
Objective thinking	8.21	0.00	0.43	15.78	3.37	16.47	15.79	15.53	15.62
Diplomacy	6.48	0.00	0.41	16.49	3.98	16.77	16.35	16.18	17.09
Radical thinking	5.11	0.00	0.38	21.22	3.68	21.81	21.22	21.11	20.93
Empathy	5.49	0.00	0.33	14.09	3.70	13.80	13.93	14.12	14.65
Intellectance	5.53	0.00	0.32	14.66	3.54	15.01	14.41	14.58	15.06
Work Ethic	3.54	0.01	0.31	17.03	3.63	17.38	17.02	17.10	16.63
Achievement	3.98	0.01	0.28	17.02	3.75	17.44	16.75	17.06	17.16
Conscientiousness	2.61	0.05	0.27	15.91	4.27	15.95	15.72	15.87	16.36
Self-discipline	2.56	0.05	0.23	13.40	3.37	13.17	13.29	13.48	13.70
Long-term Orientation	4.16	0.01	0.23	9.94	3.00	10.05	9.73	9.94	10.28
Safety	0.96	0.41	0.16	22.87	3.93	23.07	22.94	22.75	22.73
Moral Values	1.31	0.27	0.13	10.02	2.73	9.96	9.94	10.05	10.22

VALIDITY OF THE PVQ SCALES

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The validity of a psychometric measure is its property to measure the exact characteristic it is intended to measure. The extent to which an instrument can be considered valid is equivalent to the relevance and justification to use personality profiles obtained from a testing procedure. For that reason, it is crucially important to make sure that each of the PVQ scales is indeed valid. As PVQ is composed of scales from existing Psytech measures, the results of validation studies of those measures demonstrate the validity of each PVQ scale.

Common practice in the establishment of construct validity is to provide evidence of significant correlations of each of the scales with

same trait measuring scales, the validity of which has already been demonstrated.

VALIDITY OF THE 15FQ+ SCALES

While both, the 15FQ+ and the 16PF® series of tests, share the theoretical model of personality proposed by R. Cattell (1946), they also share the personality dimensions they measure. Table 18 provides correlation coefficients of each of the 15FQ+ scales with its 16PF4 and 16PF5 counterparts. “Uncorrected” and “Corrected” columns represent coefficients uncorrected and corrected for attenuation, which is caused by measurement error.

Table 18. Correlation of the 15FQ+ Factors with 16PF (Form A) and 16PF5

15FQ+ Factor	16PF (Form A)		16PF5	
	Uncorrected	Corrected	Uncorrected	Corrected
Empathy - <i>fA</i>	.31	.37	.55	.70
Intellectance - β	.10	-	.34	-
Emotional Stability - <i>fC</i>	.59	1	.81	1
Assertiveness - <i>fE</i>	.68	.99	.82	1
Enthusiasm - <i>fF</i>	.72	.98	.81	1
Conscientiousness - <i>fG</i>	.55	.89	.79†	.75
Social Boldness - <i>fH</i>	.78	.99	.88	1
Tender-mindedness - <i>fI</i>	.50	.75	.47	.56
Trust - <i>fL</i>	.29	.52	.60	.79
Abstract Thinking - <i>fM</i>	.26	.65	.79	1
Diplomacy - <i>fN</i>	.30	.70	.25	.31
Confidence - <i>fO</i>	.68	.99	.83	1
Radical Thinking - <i>fQ1</i>	.29	.43	.60	.84
Group Orientation - <i>fQ2</i>	.51	.85	.81	1
Self-Discipline - <i>fQ3</i>	.30	.50	.57	1
Composure - <i>fQ4</i>	.69	.94	.69	.89

Note. Student Sample n=183

Examination of Table 18 makes it conspicuous that all of the scales are highly correlated with their 16PF® analogues, and can be said to be equivalent to those originally developed by Cattell.

VALIDITY OF THE VMI AND OPPro SCALES

In a study demonstrating construct validity of the

VMI scales, they too were examined for correlation with 16PF®-5 scales. In addition to that, correlations with value scales from Managerial and Professional Profiler (MAPP, Knight Chapman Psychological Limited, 1989). In table 19 we present the VMI and OPPro scales that entered the PVQ and 16PF®-5 and MAPP scales that correlated significantly with them.

Table 19. Correlations of the VMI and OPPro scales with scales from the 16PF®-5 and MAPP

VMI Scales	Correlating 16PF®-5 scale	r	Correlating MAPP scale	r
Altruism (Interpersonal)	Rule-Consciousness	0.36	Material Wealth	-0.43
	Privateness	-0.25	Competition	-0.42
			Results	-0.27
			Personal Authority	-0.52
			Responsibility	-0.28
			Altruism	0.71
			Intimacy	0.49

VMI Scales	Correlating 16PF®-5 scale	r	Correlating MAPP scale	r
Affection (Interpersonal)	Privateness	-0.41	Results	-0.32
	Warmth	0.25	Recognition	0.47
	Apprehension	0.36	Altruism	0.28
	Self-Reliance	-0.28	Levity	0.25
			Intimacy	0.68
Affiliation (Interpersonal)	Self-Reliance	-0.52	Intimacy	0.68
	Warmth	0.25	Recognition	0.41
	Liveliness	0.28	Altruism	0.41
	Privateness	-0.35		
	Apprehension	0.37		
Achievement (Professional)	Perfectionism	0.33	Material Wealth	0.28
			Competition	0.48
			Results	0.52
			Personal Authority	0.56
			Responsibility	0.40
			Self-Expression	0.26
			Levity	-0.35
			Security	0.30
Economic Status (Professional)	Tension	0.24	Material Wealth	0.83
			Competition	0.50
			Results	0.36
			Recognition	0.28
			Personal Authority	0.71
			Responsibility	0.44
			Altruism	-0.55
			Security	0.39
Safety (Professional)	Openness to Change	-0.27	Novelty	-0.5
	Dominance	-0.25	Levity	-0.35
	Liveliness	-0.25	Security	0.39
Aesthetics (Professional)	Sensitivity	0.42	Material Wealth	-0.30
	Reasoning	0.28	Competition	-0.27
	Dominance	0.35	Intellect	0.35
	Social Boldness	0.30	Novelty	0.41
	Openness to Change	0.39	Self-Expression	0.45
			Altruism	0.25
			Intimacy	0.32
			Security	-0.34

VMI Scales	Correlating 16PF®-5 scale	r	Correlating MAPP scale	r
Work Ethic (Personal)	Dominance	-0.25	Material Wealth	-0.33
	Apprehension	0.24	Levity	-0.33
Moral Values (Personal)	Rule-Consciousness	0.57	Altruism	0.33
			Levity	-0.30
Traditional Values (Personal)	Rule-Consciousness Reasoning	0.38 -0.28	Perceptive	0.33
			Intellect	-0.28
			Levity	-0.29
Independence (Personal)	Social Boldness	-0.29	Material Wealth	-0.30
	Reasoning	-0.28	Competition	-0.44
	Privateness		Recognition	-0.36
			Personal Authority	-0.52
			Self-Expression	0.35
Persuasiveness	Dominance	0.31	Responsibility	0.32
	Liveliness	0.36	Intellect	0.28
	Social Boldness	0.55	Results	0.27
	Group Orientation	0.30		
Objective Thinking	Utilitarian	0.67	Novelty	-0.36
	Vigilance	0.33	Self-Expression	-0.63
	Concrete	0.48		
	Traditional	0.42		
Resilience (optimistic)	Emotional Stability	0.32	Recognition	-0.37
	Vigilance	-0.40	Responsibility	0.34
	Apprehension	-0.30	Intellect	0.30
	Tension	-0.34		
Patience (contesting)	Vigilance	-0.37	Competition	-0.50
	Tension	-0.22	Results	-0.44
	Emotional Stability	0.26	Personal Authority	-0.34
			Responsibility	-0.40
			Levity	0.41

From the table we can see that the scales, with which VMI scales were found to correlate, give quite a coherent picture of the semantic field of each of the VMI scale. For example, we observe strongest relationships wherever the construct measured by VMI scale is similar to that in MAPP. For example, Economic Status is very strongly related to Material Wealth, and also to Personal Authority, Competition and Results, but it is negatively related to Altruism. Altruism in its turn

is very highly correlated with its MAPP counterpart.

Affection is the most strongly related to MAPP Intimacy and Recognition, negatively with 16PF®-5 Privacy as would be expected. Negative correlation with Results suggests relations as opposed to results orientation, and the correlation with 16PF®-5 Apprehension points at the somewhat neurotic component that is sometimes mixed in the need for affection.

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Affiliation is negatively correlated with 16PF®-5 Self-Reliance and Privatness, and positively with MAPP Intimacy, Recognition, and Altruism, all as expected. Achievement, too, makes a coherent picture out of the scales it is related to, such as 16PF®-5 Perfectionism, MAPP Personal Authority, Results, Competition, and Responsibility.

Safety is strongly negatively correlated to MAPP Novelty, which reflects the essence of this value. Negative relationship with MAPP Levity and 16PF®-5 Liveliness expresses the absence of light-mindedness which characterises people who value safety. The correlation with MAPP Security reinforces the relevance of the VMI Safety construct yet further.

The Aesthetics scale is related to a multitude of 16PF®-5 and MAPP scales representing intellectual openness and self-expression.

Three 'conformity' values are: Work Ethic, Moral Values, and Traditional are all negatively related to MAPP Levity scale, Moral and Traditional values are both related to 16PF®-5 Rule-Consciousness, while Work Ethic is negatively related to Dominance and Material Wealth, and somewhat related to Apprehension.

The Independence scale appears in a very interesting light, indicative of people who truly value independence sometimes at the expense of Material Wealth, Personal Authority, and Recognition, often giving up Competition, but find Self-Expression important.

Persuasiveness is related to 16PF®-5 scales that altogether represent initiative, social proactivity, results orientation and personal responsibility. The correlations of Objective Thinking make a picture of pragmatic, down-to-earth perception with a preference for proven methods and sceptical attitude to all new.

Resilience is related to Emotional Stability, Trust

(negative Vigilance), and negatively to Tension and Apprehension, which together reflect the tendency to worry and be restless. Patience is characterised by negative relationships with all scales that are inherent to coronary Type A personality: Tension, Competition, Results orientation, Personal Authority, and Responsibility. It is positively related to Levity, indicating the 'take-it-easy' approach that may be characteristic of people high on Patience. In this way, we can say that external indicators such as relationships with scales from other tests that are similar in meaning reflect the intended semantic fields and correspondent psychological attributes measured by the various PVQ scales.

VALIDITY OF THE ENERGY AND DRIVE AND LONGTERM ORIENTATION SCALES

Two PVQ scales were developed around the criterion of grit, a construct defined as perseverance and passion for long-term goals (Duckworth et al., 2007; Duckworth & Quinn, 2009). These are Longterm Orientation and Energy and Drive that, together with Resilience, are conceived to describe the construct of grit. Indeed, they correlate with each other higher than with any other PVQ scale ($r = 0.53$) what suggests that they do have a common latent dimension. In addition to that, they also correlate with Emotional Stability ($r = 0.46$), Resilience ($r = 0.46$), Conscientiousness ($r = 0.43$), Social Boldness ($r = 0.43$), Confidence ($r = 0.43$), Persuasiveness (0.38), Achievement ($r = 0.37$), Work Ethic (0.35), and Diplomacy (0.32). Altogether these scales describe emotional maturity, self-confidence and social comfort of people who are devoted to the achievement of the goals they set for themselves.

VALIDITY OF THE PVQ SCALES

PVQ was translated into several languages. Translations were cross-culturally adapted in accordance with accepted methodology so to preserve acceptable psychometric properties, such

as internal consistency of the scales. In table 20, we provide information on scale homogeneity of a few of PVQ versions in other languages, namely, in Italian and Turkish.

Table 20. Coefficients on internal consistency of the PVQ scales in different languages

Scale	Standardized alpha EN	Standardized alpha TR	Standardized alpha IT
Empathy	0.79	0.81	0.84
Social boldness	0.73	0.76	0.86
Group-orientation	0.74	0.79	0.84
Intellectance	0.74	0.73	0.78
Assertiveness	0.61	0.59	0.79
Diplomacy	0.7	0.74	0.72
Persuasiveness	0.74	0.74	0.77
Trust	0.73	0.71	0.84
Enthusiasm	0.64	0.69	0.78
Conscientiousness	0.79	0.79	0.85
Tender-mindedness	0.58	0.75	0.78
Objective thinking	0.54	0.75	0.79
Abstract thinking	0.53	0.67	0.75
Radical thinking	0.64	0.61	0.77
Self-discipline	0.77	0.76	0.81
Long-term Orientation	0.74	0.79	0.7
Energy and Drive	0.72	0.73	0.74
Emotional Stability	0.75	0.83	0.83
Confidence	0.72	0.71	0.77
Resilience	0.66	0.78	0.69
Patience	0.77	0.69	0.75
Composure	0.72	0.76	0.84
Altruism (Interpersonal)	0.6	0.57	0.63
Affection (Interpersonal)	0.78	0.68	0.73
Affiliation (Interpersonal)	0.77	0.69	0.83
Achievement (Professional)	0.64	0.7	0.81
Economic Status (Professional)	0.77	0.84	0.87
Safety (Professional)	0.7	0.73	0.82
Competition (Professional)	0.76	0.64	0.79
Aesthetics (Professional)	0.78	0.83	0.84
Work Ethic (Personal)	0.64	0.73	0.79
Moral Values (Personal)	0.75	0.74	0.77
Traditional Values (Personal)	0.67	0.69	0.74
Independence (Personal)	0.78	0.71	0.82
Social Desirability	0.73	0.75	0.8

It is seen from the table that satisfactory levels of internal consistency are maintained through

translated versions of the PVQ.

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