

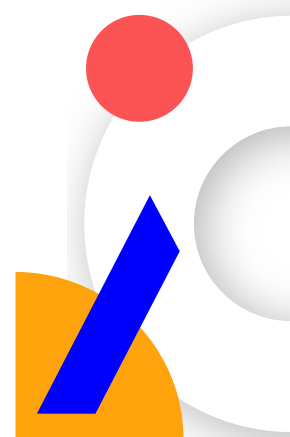
Technical Manual PDA Assessment





TECHNICAL DATA SHEET

- **Original name:** PDA (Personal Development Analysis) Assessment.
- **Adaptation name:** PDA (Personal Development Analysis) Assessment.
- **Author(s):** PDA International.
- **Administration:** Individual application.
- **Duration:** 15–20 minutes.
- **Target population:** Persons over 16–18 years of age, with the possibility of exceptionally applying the exceptionally from 13 years of age.
- **Content area:** Behavior and personality.
- **Area of application:** Work and organizations. Human Resources (HR).
- **Assessment Objective:** Habitual behavioral patterns linked to personality according to William M. Marston's theoretical model.
- **Materials:** Pencil and paper or computer with stable internet connection.





GENERAL DESCRIPTION

Objectives of the test

The main objective of the PDA Assessment test is to describe and analyze the Behavioral Profile of individuals, as well as their potential, and compare it with the behavioral demands of a given job in order to be able to behavioral demands of a given job in order to make decisions in the different HR processes.

The PDA Assessment test does not measure intelligence or skills, but seeks to identify the skills of the person being assessed, his or her motivators, and his or her way of making decisions, among other aspects, in order to other aspects, in order to direct him/her to achieve a successful performance.

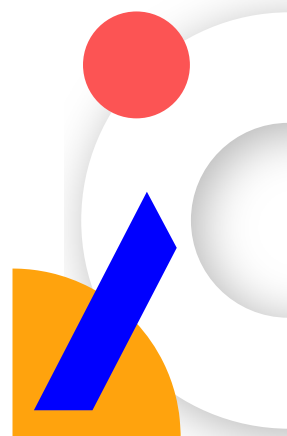
Scope of application and target population

The PDA Assessment has been specially designed for its application in the work environment, as a tool to assist in decision making within the HR department. The target population of PDA Assessment is people 16 years of age and older. In addition, PDA Assessment is available in different languages and can be applied irrespective of gender as has been corroborated by psychometric methods.

Attributes to be measured

PDA Assessment focuses on the measurement of an individual's behavior. For this purpose, this test evaluates five dimensions of behavior equivalent to the five axes proposed from the proposed from the Marston personality model (1928). Namely:

- Risk
- Extroversion
- Patience
- Conformity to Norms
- Self-control



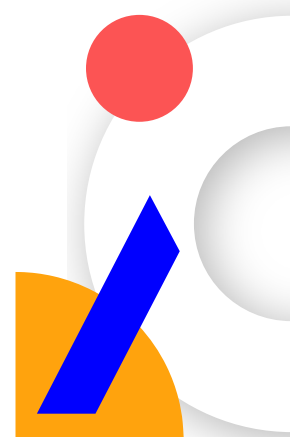


These dimensions are evaluated both in the Natural Profile (the interviewee's view of himself/herself) and in the Adapted Profile (how the interviewee believes others see him/her).

It should be noted that, although people's natural tendencies are relatively stable, some change in the habitual way of responding is to be expected, influenced by learning and the ability to adapt to different situations.

Material

This assessment tool has been designed to be applied in a computerized format, through a computer with a stable internet connection, as well as in pencil and paper format.





THEORETICAL FRAMEWORK

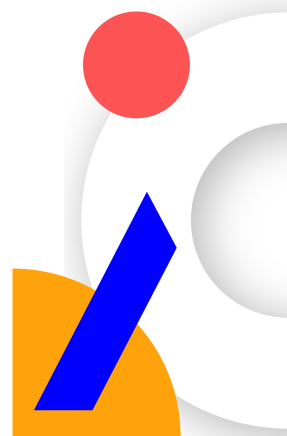
The Personal Development Analysis (PDA) tool is based on the work of William M. Marston. This author did most of his work in the 1940s and was influenced by the models and authors in vogue at the time. The ideas of this author still have a great impact today and serve as a basis, not only for the PDA tool, but also for many other well-known tests such as the DISC, for example.

Personality traits are a concept widely used in psychology to understand and describe a person's behavior. There are two perspectives regarding their nature. On the one hand, there are the proponents that personality traits are just labels to define behaviors, and on the other hand, there are those who believe that they are real, internal that they are real, internal characteristics that distinguish individuals from one another.

One way of resolving the problem of this duality is to consider two levels of personality traits (Meehl, 1986):

- **Superficial traits (surface traits).** They refer to categories of behavior that can be observed, labelled categories of behavior that can be observed, labeled and measured. They describe the behavior.
- **Origin trait.** These are internal characteristics that presumably drive the behavior. These traits can only be inferred from observed or reported behaviors. They are used to explain or substantiate a person's behavior.

The presence of a particular personality trait can be inferred by noting that the same behavior occurs repeatedly over time and in different situations. In addition, we can observe that a trait is linked to a specific situation when we observe that certain behaviors are consistently produced whenever that situation occurs.





Precursors of Marston's theory

For the formulation of his theory of personality, Marston relied on different authors one of the most influential being P. Lecky. Marston also used ideas from other models. For example, he was influenced by Freudian theory, he was influenced by the concepts of energy level and self-control. In addition, there are contemporary concepts and theories similar to the ideas already expounded by Marston, such as that of the "Place" and the "Self-control" such as the "locus of control", the "belief theory of a just or unjust world" and his concept of the "self or Unjust World" and its concept of "distributive justice" or the Circumplex Model and Wiggins' (1991).

Theory of Perception

The Theory of Perception conceives that the person perceives the world in an individualized way according to the selective attention he/she pays to the stimuli, how he organizes them and the interpretation of the experiences he/she lives. This idea of the importance of the idiosyncratic perception that people show to the world around them was reflected in Marston's model.

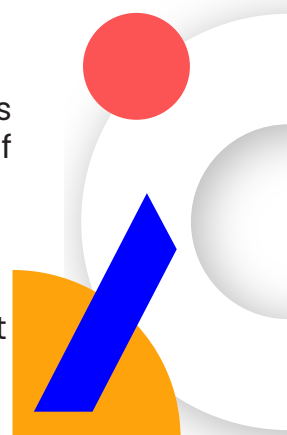
Self-concept theory (Lecky)

In this theory Lecky (1945) describes the concepts of the "social self" and the "ideal self". Between the first 15-18 years of life people develop a relatively stable perception of themselves (self) on the basis of their experiences. At the same time, they also develop a perception or expectation of what the environment will demand of them. The behavior will depend on the interaction between the self-concept and the demands of the environment.

On this basis, Marston defined that individual behavior is determined, in part, by the interaction between the perceptions of the environment and the demands of the environment.

Self-Consistency Theory (Lecky)

In this theory Lecky asserts that people tend to assimilate ideas that are consistent with how we think we are and reject those that are consistent consistent with how we believe ourselves to be and reject inconsistent ones. This author conceives the mind as a unit that organizes ideas into a coherent system. The core of the mind is the self-concept.





Semantic methodology

Word lists have a long history as tools to learn about and measure personality traits (Allport and Odbert, 1936; Cattell, 1943). This type of methodology was also used by Marston.

MARSTON PERSONALITY MODEL

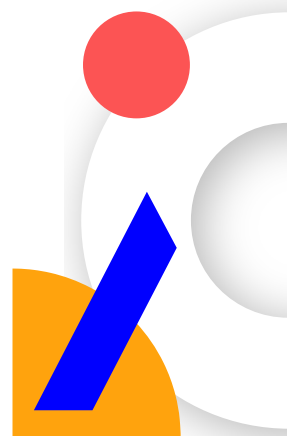
The Marston Personality Model is also known as the "Geometric Unipolar Spherical Personality Model". This theory seeks to help understand how people relate to each other, rather than what individuals are in depth.

Marston contributed great theories and concepts in the field of psychology which were collected in two of his great works: Emotions of Normal People (1929) and Integrative Psychology (1931).

Principles of the model

Marston's model assumes that individuals interact dynamically with their environment, responding to favorable or unfavorable conditions in a way that reflects their personal power in relation to these conditions. Marston's theory emphasizes surface traits, rather than traits of surface traits, rather than traits of origin. The structure of Marston's Personality Model is based on three propositions fundamental:

- **Perception of the environment.** People will perceive situations in the environment as favorable (non-threatening) or unfavorable (threatening).
- **Individual's response.** The individual's reaction to any stimulus in the environment will be either approach or avoidance. In no case will he or she remain neutral.
- **Energy level.** People have a certain quantum of energy to act.





People tend to behave in a certain way depending on how they perceive the situation (favorable or unfavorable) and their natural predisposition to take action or retreat.

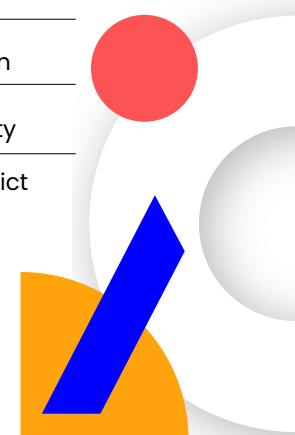
Structure of the model

From the intersection of the first two principles (propositions), four quadrants are generated, which give rise to the axes of the model:

- Risk response occurs when the person acts proactively in an environment perceived as unfavorable.
- The Extroversion response occurs when the person acts proactively in an environment perceived as favorable.
- The Patience response is when the person accommodates, passively, in the face of a perceived favorable environment.
- The Norm Conformity response is when the person passively accommodates to a perceived favorable environment.

Each of the axes is conceptually and statistically independent of the others. See more detailed description of the interpretation of each of them can be found in Table 1.

Axis	Quadrant	Mesures	The person seek...	The person avoids...
Risk (R)	Proactive-Unfavorable	results, initiative, risk-taking	Results tangible results	Failure
Extroversion (E)	Proactive-Favorable	Inclination to interact with others	Working with others	I Rejection
Patience (P)	Proactive-Favorable	Tendency to respond in a patient and peaceful manner	Supportive and specialize	Insecurity
Norms (N)	Reactive-Unfavorable	Need to be subject to rules in order to obtain results	Quality, meet standards, specialization	The conflict

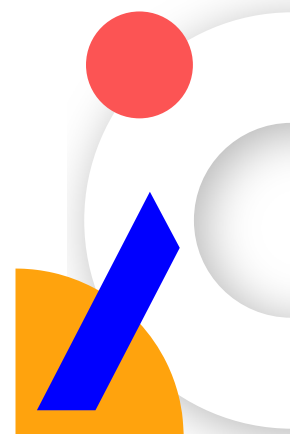
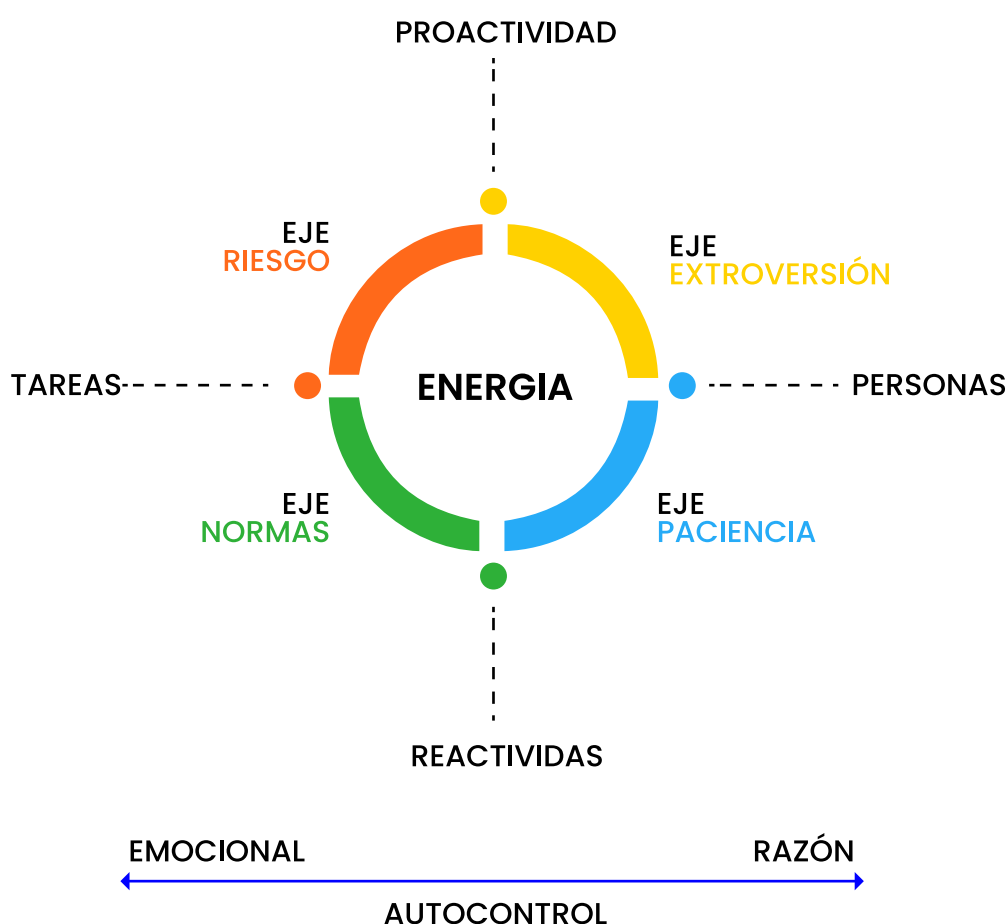




Years later a fifth axis was added, Emotional Self-Control (A), interpreted as the level of self-discipline, emotional self-control and sense of social responsibility.

It is also related to emotional intelligence. This fifth axis affects and influences the other four.

Figure 1 shows a representation of Marston's model. The personality structure can be represented as a geometric sphere in the center of which is the individual at a "zero energy" level. A person's behavioral tendency is represented by the four axes that originate at the center of this sphere and are directed outward.





To assess each of the axes (REPNA) the PDA Assessment test makes use of 86 ungraded behavioral descriptors. The same adjectives are used to assess the person's Natural and Adapted Profile and the Adapted Profile of the person.

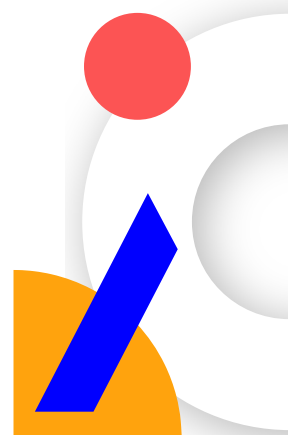
Another important concept from this model is that of Energy Level. By "Energy Level" (quantum of energy) Marston understood the available energy supply of an individual that an individual's available energy supply that contributes, to a large extent, to the overall efficiency of the person's organism.

Assessment tool

Marston used the Semantic Methodology to develop a bank of descriptors. This conducted a study of the properties of 3,000 words that he eventually reduced to a list of 86 core words.

Other variants were born from the tool originally proposed by Marston. The Activity Vector Analysis (AVA) was proposed by Clarke in 1942 and is the first version of the tool. Later, due to the complex analyses required, other simplified tools emerged. One of the best known is the "DiSC". This tool was proposed by Geier (1958) and involved a simplification of the tool, both of the form and of the necessary analyses.

Since the 1990s, thanks to the advance of computers, purer versions of the evaluation have been more pure versions of the evaluation, more similar to Marston's original model. It is at this time that the instrument known as PDA Assessment was born.





PDA ASSESSMENT TOOL

PDA Assessment evaluates the five axes (REPNS) proposed in the Marston Model from two perspectives: the Natural Profile and the Adapted Profile. To do so, it makes use of the list of 86 adjectives. In addition, this tool offers a series of indicators that allow to the analysis of the person's behavior.

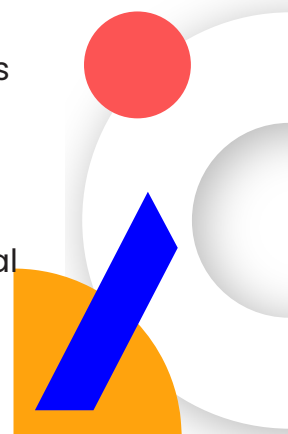
Indicators

Measures the quantum of available energy an individual has and how much energy he/she uses. It is a very valuable indicator to measure the individual's satisfaction of the individual in his current job or if it generates demotivation or stress at the current time. It should be noted that measuring energy level does not imply measuring intelligence. This indicator is obtained for each of the profiles.

Energy Balance (EB). It expresses the perception that the person being evaluated has of the difference that exists between the energy demanded by his or her situation and the energy demanded by his or her own situation and the energy he himself possesses. It should be noted that it reflects the individual's Energy Balance at the time of completing the PDA Form. In other words, this indicator is circumstantial and must be taken into account when assessing the individual's situation. It will allow us to observe whether the evaluated feels that he/she is being taken advantage of, wasted or overworked.

Decision Making (DM). It allows us to identify whether at the moment of making decisions the person will move forward with the information he/she has available, assuming some degree of risk, or if he/she will proceed with caution, collecting more information in order not to make a mistake. In addition, this indicator makes it possible to assess whether the person is facing a conflict that needs to be resolved. This indicator is calculated for each profile separately.

Profile Modification (PM). Reflects the person's ability to modify his or her own behavioral tendencies and accommodate the behavioral tendencies required to be successful in the situation. It compares the tendencies expressed in the Natural Profile (self-concept) with the tendencies expressed in the Adapted Profile (specific to the current role). The more aspects of the natural style a person modifies, the more flexible and adaptable he/she is.





Axis Intensity (AI). This indicator evaluates how accentuated, characteristic and evident a certain axis is in a person. That is, to what extent behavior of a person, as measured by each axis, stands out from the rest. It is calculated separately for each profile.

Profile Intensity (PI). This indicator defines the intensity of the total profile of the person who completed the PDA Form. It reflects how faithful the person is to his or her own tendencies, and how accentuated, characteristic and evident this person's style is. The two extreme axes describe the most salient characteristics of the PDA Profile for a given person. This indicator is calculated for each of the profiles.

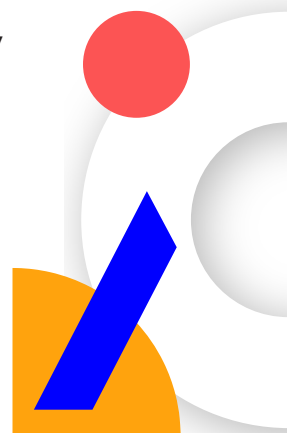
Form Time (FT). Time in minutes that the person has used since the first word list appears during the first list of words appears during the evaluation (phase 2, see below). Consistency. It is used to evaluate how consistent and coherent the information provided by the individual or how clear and defined his or her behavioral tendencies are behavior. To calculate the consistency of a report, use is made of the indicators of NE, EE, MP, IP and TF. There are three possibilities: consistent, inconsistent, inconsistent and invalid report, depending on the score of this indicator. In the case of an invalid report, the analyst must investigate the causes and, if appropriate, reapply the test.

Structure and application rules

The PDA Assessment test consists of four moments of information collection.

The instructions given to the person being assessed prior to the administration of the instrument are as following:

"PDA Assessment is a tool developed to get to know people by identifying their natural behavioral styles. There is no pass or fail, no good or bad answers. Completing the PDA Form can take between 10 and 15 minutes. It is important to complete it spontaneously, individually and without interruptions. Once you have the time and the right environment to complete the form, please click on the link below".





Once the introductory instructions have been received, we move on to the collection of information::

- Phase 1. Collection of personal information. In this first step, the person being evaluated answers such as name and surname, date of birth, gender and e-mail address.

None of the data is involved in the calculation of the profile, although some of them will be reflected in the final report.

- Phase 2. Adjectives of the Adapted Profile. This second phase, together with the following one, form the core of the evaluation. Here the list of the 86 adjectives is presented and the respondent is asked to select those the evaluatee is asked to select those that he/she believes other people would use to describe him/her.

- Phase 3. Natural Profile Adjectives. In this phase, the same 86 adjectives as in the previous phase are presented again. In this phase, the same adjectives are presented again as in the previous phase and in the same order. The evaluated person must select those adjectives that he/she considers that best define his/her behavior.

- Phase 4. Free narrative self-description. Finally, the fourth phase consists of the presentation of a blank space where the evaluatee can write an open-ended description of himself/herself.

Results and interpretation

Based on the words selected by the individual, a software performs the necessary calculations to obtain the trends and the distribution of the individual's energy on each of the axes. The system performs this equation both for the subject's perception of himself/herself (Natural Profile) and the subject holds about himself (Natural Profile) as well as for the perception that the evaluatee believes the environment has about him (Natural Profile).

Among other information, the program returns a graph with the subject's Behavioral Profile. This graph shows, among other things, the results obtained for each axis in each of the profiles, as can be seen in the following table. Both graphically and numerically. The program also provides information about each of the indicators.

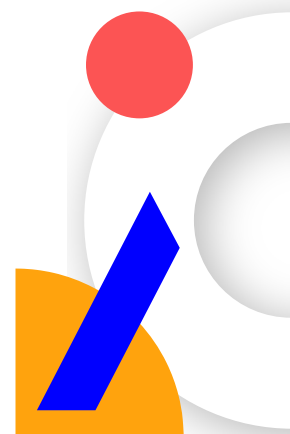
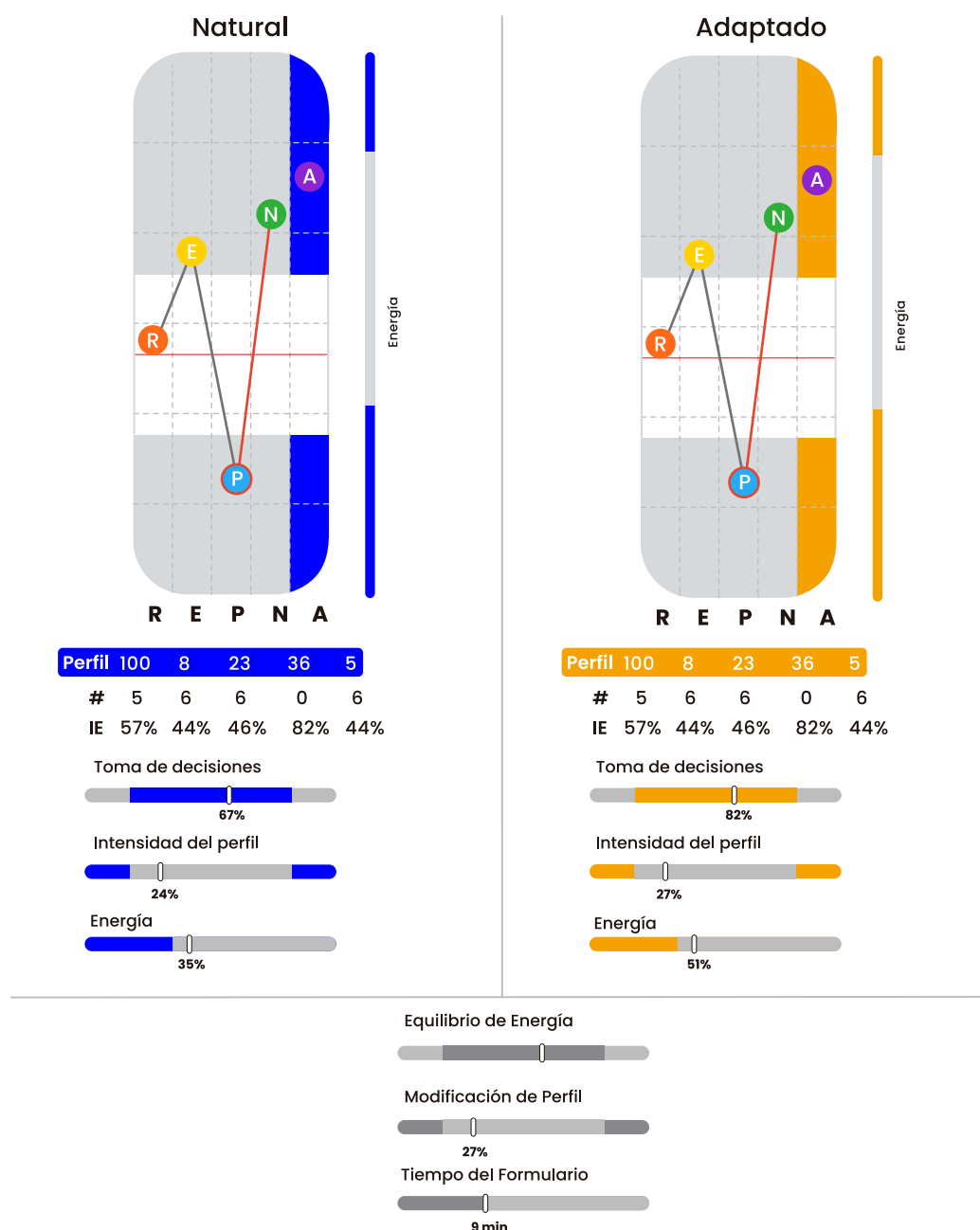


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The PDA Assessment system is designed for qualified personnel to administer the test and to interpret and analyze the information obtained. These people are known as PDA Analysts.

PDA Analysts must be familiar with the needs, culture, timing and idiosyncrasies of the company in which they work, so they should be able to effectively apply the information obtained through the PDA methodology to strengthen their company's processes and respond to the particular needs of internal customers and the organization.



SCIENTIFIC ENDORSEMENT

PDA Assessment is a solid and reliable instrument with a theoretical structure that serves as its basis and has been developed over years of studies and research.

In addition, different studies have been conducted to obtain accurate data on the reliability and validity of this test. There is currently strong evidence to support the application of this instrument in business and industrial selection and selection processes of selection and talent management.

However, PDA Assessment is under constant review and evaluation to remain up to date and to ensure its usefulness in an ever-changing world.

2021 Study

The latest and most extensive study on the PDA Assessment tool was conducted in May 2021.

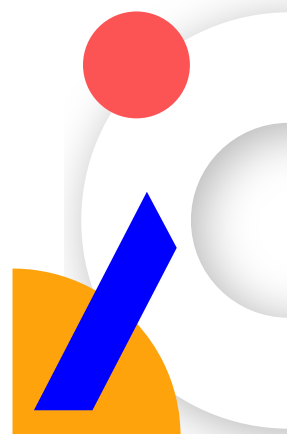
In this study, various psychometric indicators were evaluated in a sample of 1,090 respondents. The sample was composed of workers who were in their respective functions in their respective companies at the time the PDA Assessment was applied. In all cases the assessment was conducted online.

This study has a number of strengths. On the one hand, it was conducted on a very large sample of subjects. In addition, the analyses used combine classical techniques with more techniques together with more up-to-date statistical tools. Finally, the fact that it was conducted through an external consultancy carried out by 2E, Estudios, Evaluaciones e Investigaciones S.L., which increases the confidence that can be placed in the conclusions.

Reliability Indicators

Reliability" refers to the stability of the scores obtained with an instrument. That is, how well the items of a test measure a certain trait or competency.

There are different ways to measure the reliability of a test. One option is to





focus on how consistent the scores are, or focus on the test's discriminatory ability of the test. In addition, different perspectives can be taken towards the analysis, from more classical procedures such as those offered by the Classical Test Theory (CTT) to the procedures proposed by the Item Response Theory (IRT).

Item Response Theory (IRT).

"Internal consistency" is understood as the degree to which items of the same scale measure the same trait.

The study conducted in May 2021 analyzed this index by means of two indicators: the Cronbach's alpha indicator and the Omega Coefficient (ω).

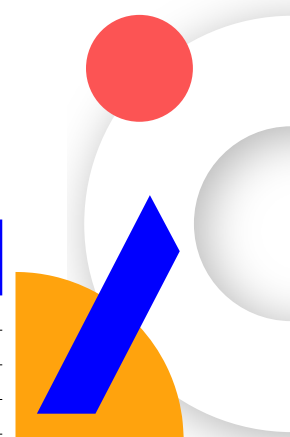
Cronbach's alpha

The most classic procedure to evaluate the internal consistency of a test is to use the Cronbach's alpha coefficient. This indicator measures how similar the items are to each other and is based on the hypothesis that items measuring the same construct or dimension have a high correlation between them. It is generally considered that values lower than 0.6 Table 2 shows the results of this coefficient for each axis and each profile.

As can be seen, all values are above 0.66, with the Risk axis showed the highest values (0.77 in the Adapted Profile). In this study, the reliability of the scale if one item was eliminated to detect problematic items. There was no item whose elimination substantially improved the consistency of the test.

Table 2. Internal consistency (Cronbach's alpha), Study 2021.

Axis	Items	Alpha by profile	
		Natural	Role
R	17	0,75	0,77
E	17	0,75	0,74
P	17	0,74	0,74
N	19	0,67	0,67
S	16	0,72	0,73





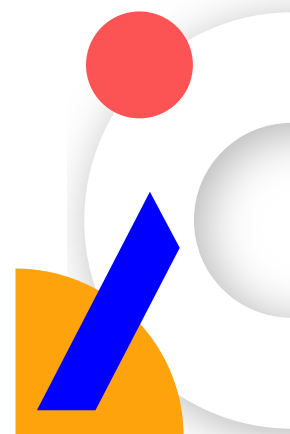
Omega Coefficient

This indicator, which has been gaining ground in recent years, is especially indicated when the scale to be evaluated uses dichotomous items, as it makes use of the is particularly indicated when the scale to be evaluated uses dichotomous items, since it makes use of a polychoric correlation matrix of polychoric correlations. As in Cronbach's alpha coefficient, values above 0.6 are interpreted as reliable.

Table 3 shows the results obtained for this coefficient by profile and sex, calculated on the Natural Profile. All the values were above 0.83, with the axis with the highest reliability being that of Extroversion (0.88). In terms of sex, the scales were slightly more reliable for men than for women. The risk axis was the most reliable for men, while for women the most reliable axis was the Risk axis (0.88).

Table 3. Internal consistency (Omega Coefficient), 2021 Study

Scale	Item	Omega by profile		Woman	Man
		Natural	Role		
R	17	0,86	0,88	0,84	0,91
E	17	0,88	0,86	0,87	0,86
P	17	0,85	0,85	0,83	0,86
N	19	0,84	0,84	0,83	0,85
S	16	0,84	0,85	0,83	0,86

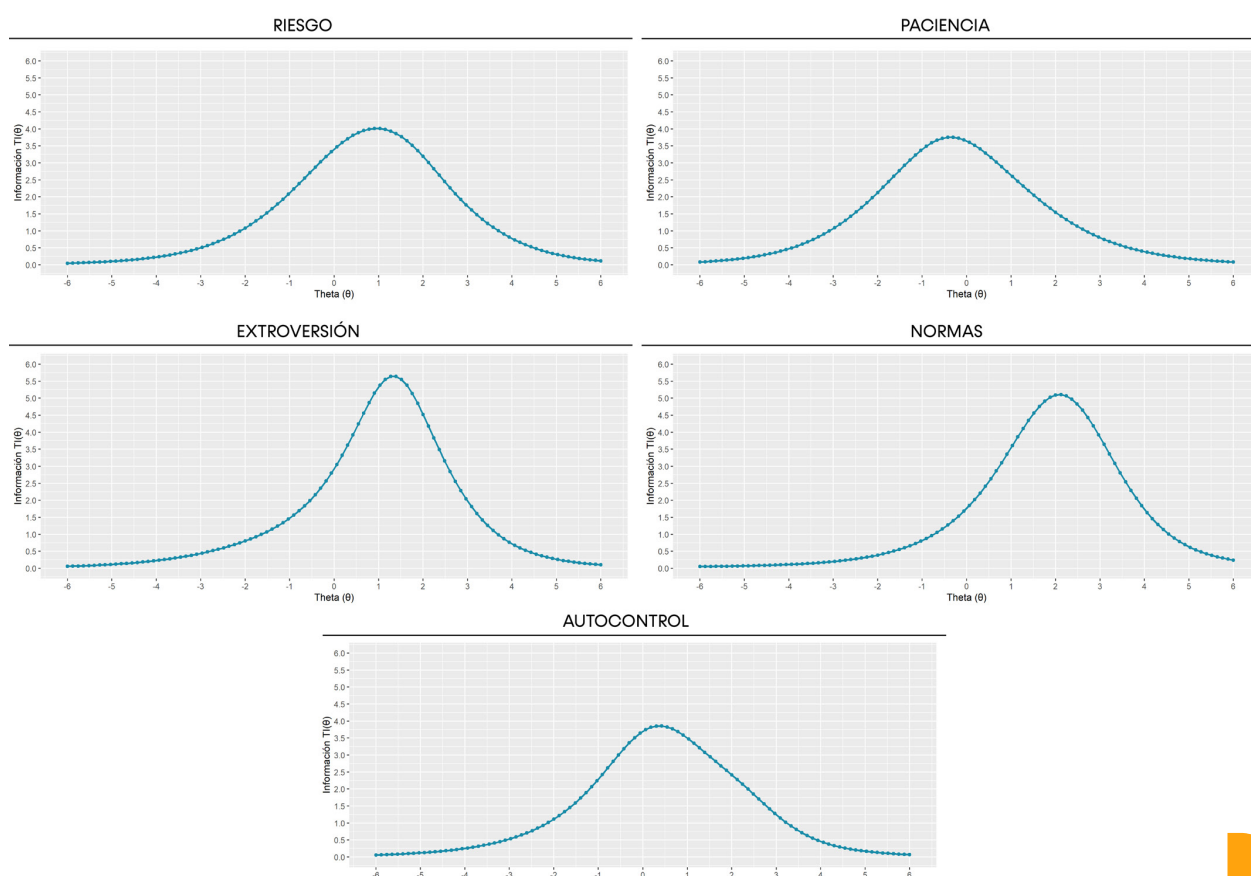


Information Function

From the IRT perspective, the accuracy of the measurement can be analyzed. From this model "Information Curves" are used as indicators of measurement accuracy as a function of trait level. As a previous step, a calibration of the items was performed from the two-parameter model.

The different curves can be seen in Figure 3. The Risk, Extroversion and Norms dimensions proved to be particularly informative for high levels of the corresponding trait. The Self-Control dimension was more appropriate for medium and high levels of the skills and finally, the Patience dimension was especially useful for reporting subjects with a low level of the trait.

Figure 3. Internal consistency (Information Function), 2021 Study.





Validity Indicators

"Internal Validity" is a very broad concept that encompasses multiple facets. In a global way validity is understood as the extent to which a test measures what it purports to measure, and not something else.

Internal Validity

Internal validity" is an evaluation of the extent to which scores obtained from the test are consistent for the test are consistent with the fundamental model on which the test was developed. In the last study conducted, great emphasis was placed on the analysis of the internal validity of the PDA Assessment by studying the PDA Assessment, studying both the correlations between items and the factorial structure of the test.

Correlations

Given the dichotomous nature of the items, a study of the tetrachoric matrices was carried out.

The tables below refer to the natural profile. The highest correlations for the Risk dimension are observed between items 65 and 57 (Dominant and Aggressive), 57 (Dominant and Aggressive) and between items 75 and 57 (Bold and Aggressive). At the other extreme the lowest correlations, even negative ones, are observed between items 57 and 41 (Aggressive and Determined), highest value for items 79 and 28 (Distinguished and Loquacious) and 81 and 43 (Witty and Popular). The lowest correlations were found between the pairs formed by items 33 and 5 (Persuasive and Cheerful).

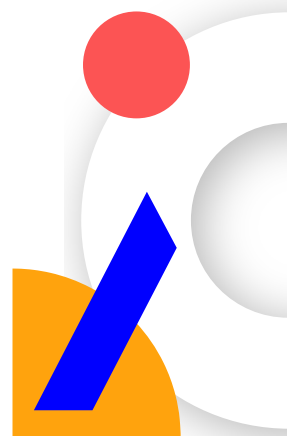


Table 5. Correlations between Risk items

	I3	I8	I13	I18	I22	I27	I35	I41	I45	I51	I57	I63	I65	I71	I75	I80	I85
I3	1,00																
I8	0,32	1,00															
I13	0,30	0,24	1,00														
I18	0,38	0,24	0,25	1,00													
I22	0,39	0,15	0,11	0,22	1,00												
I27	0,49	0,15	0,14	0,30	0,37	1,00											
I35	0,36	0,24	0,15	0,16	0,46	0,39	1,00										
I41	0,32	0,34	0,20	0,13	0,34	0,17	0,47	1,00									
I45	0,25	0,29	0,17	0,30	0,31	0,25	0,35	1,00									
I51	0,27	0,35	0,30	0,16	0,26	0,19	0,34	0,43	1,00								
I57	0,33	0,19	0,22	0,43	0,41	0,30	0,17	-0,09	0,34	0,21	1,00						
I63	0,33	0,10	0,15	0,10	0,22	0,24	0,32	0,32	0,13	0,23	-0,04	1,00					
I65	0,36	0,33	0,35	0,33	0,29	0,31	0,21	0,28	0,25	0,38	0,64	0,09	1,00				
I71	0,26	0,27	0,08	0,11	0,32	0,11	0,26	0,38	0,23	0,30	0,20	0,31	0,17	1,00			
I75	0,47	0,17	0,09	0,32	0,55	0,52	0,36	0,19	0,42	0,38	0,56	0,23	0,46	0,19	1,00		
I80	0,26	0,15	0,14	0,18	0,22	0,23	0,16	0,11	0,29	0,18	0,25	0,17	0,29	0,05	0,36	1,00	
I85	0,21	0,12	0,11	0,13	0,25	0,39	0,27	0,15	0,19	0,20	0,14	0,29	0,30	0,20	0,23	0,14	1,00

Table 6. Correlations between Extraversion items

	I5	I9	I15	I19	I28	I30	I33	I37	I43	I48	I55	I58	I67	I73	I77	I79	I81
I5	1,00																
I9	0,17	1,00															
I15	0,28	0,39	1,00														
I19	0,27	0,28	0,43	1,00													
I28	0,17	0,21	0,38	0,74	1,00												
I30	0,31	0,18	0,27	0,23	0,16	1,00											
I33	-0,01	0,51	0,33	0,43	0,50	0,19	1,00										
I37	0,35	0,25	0,25	0,25	0,24	0,31	0,08	1,00									
I43	0,29	0,34	0,48	0,59	0,57	0,13	0,44	0,39	1,00								
I48	0,26	0,28	0,26	0,17	0,12	0,12	0,08	0,18	0,33	1,00							
I55	0,22	0,24	0,41	0,41	0,29	0,14	0,24	0,15	0,58	0,56	1,00						
I58	0,12	0,19	0,27	0,32	0,47	0,29	0,34	0,41	0,45	0,11	0,31	1,00					
I67	0,14	0,24	0,32	0,23	0,18	0,18	0,25	0,14	0,46	0,37	0,63	0,33	1,00				
I73	0,26	0,16	0,15	0,16	0,20	0,10	0,09	0,14	0,27	0,24	0,29	0,34	0,39	1,00			
I77	0,14	0,22	0,16	0,19	0,11	0,20	0,18	0,33	0,24	0,24	0,24	0,37	0,25	0,20	1,00		
I79	0,15	0,28	0,42	0,23	0,20	0,13	0,26	0,24	0,51	0,58	0,50	0,42	0,46	0,25	0,43	1,00	
I81	0,14	0,17	0,26	0,08	0,01	0,19	0,05	0,15	0,20	0,26	0,21	0,17	0,19	0,26	0,28	0,50	1,00



Table 7. Correlations between Patience items

	I1	I7	I11	I16	I21	I24	I32	I36	I46	I47	I53	I60	I64	I69	I72	I76	I83
I1	1,00																
I7	0,29	1,00															
I11	0,37	0,30	1,00														
I16	0,16	0,32	0,21	1,00													
I21	0,27	0,16	0,22	0,21	1,00												
I24	0,29	0,26	0,32	0,27	0,26	1,00											
I32	0,13	0,30	0,09	0,36	0,39	0,27	1,00										
I36	0,21	0,18	0,25	0,26	0,11	0,21	0,16	1,00									
I46	0,41	0,24	0,32	0,20	0,15	0,20	0,22	0,27	1,00								
I47	0,31	0,19	0,29	0,21	0,14	0,18	0,16	0,28	0,40	1,00							
I53	0,24	0,19	0,25	0,25	0,12	0,23	0,29	0,33	0,32	0,43	1,00						
I60	0,19	0,24	0,25	0,19	0,13	0,21	0,23	0,26	0,22	0,21	0,24	1,00					
I64	0,24	0,11	0,19	0,19	0,07	0,21	0,13	0,22	0,28	0,54	0,29	0,18	1,00				
I69	0,19	0,39	0,20	0,21	0,14	0,18	0,26	0,12	0,38	0,25	0,29	0,17	0,22	1,00			
I72	0,16	0,18	0,17	0,13	0,06	0,28	0,27	0,20	0,34	0,29	0,23	0,24	0,23	0,26	1,00		
I76	0,30	0,27	0,18	0,18	0,10	0,26	0,16	0,13	0,33	0,45	0,32	0,26	0,51	0,28	0,33	1,00	
I83	0,26	0,17	0,25	0,12	0,17	0,22	0,16	0,26	0,37	0,43	0,36	0,10	0,52	0,23	0,25	0,36	1,00

Table 8. Correlations between the Norms items

	I6	I12	I17	I23	I26	I31	I38	I40	I42	I44	I50	I52	I54	I56	I62	I66	I70	I78	I82
I6	1,00																		
I12	0,05	1,00																	
I17	0,26	0,26	1,00																
I23	0,07	0,04	0,24	1,00															
I26	0,33	0,21	0,29	-0,19	1,00														
I31	0,15	0,00	0,26	0,23	-0,01	1,00													
I38	0,18	0,29	0,22	0,11	0,32	0,23	1,00												
I40	0,18	0,25	0,10	0,02	0,30	0,02	0,31	1,00											
I42	-0,02	0,46	0,21	-0,02	0,31	-0,06	0,30	0,37	1,00										
I44	-0,03	0,38	0,19	0,14	-0,02	0,07	0,49	0,43	0,42	1,00									
I50	-0,02	0,16	0,09	0,23	-0,18	0,23	0,15	-0,09	-0,05	0,17	1,00								
I52	0,29	0,29	0,25	-0,06	0,54	0,06	0,48	0,43	0,48	0,28	-0,13	1,00							
I54	0,02	0,37	0,12	0,17	0,03	0,07	0,32	0,15	0,35	0,30	0,27	0,19	1,00						
I56	-0,08	0,29	-0,06	0,00	0,05	0,03	0,11	0,50	0,36	0,43	-0,03	0,27	0,33	1,00					
I62	0,09	0,26	0,17	0,11	0,19	0,10	0,33	0,30	0,23	0,40	0,06	0,20	0,28	0,20	1,00				
I66	0,04	0,46	0,10	-0,07	0,28	0,04	0,33	0,35	0,53	0,21	0,03	0,55	0,35	0,41	0,32	1,00			
I70	-0,05	0,40	0,05	-0,03	0,24	-0,03	0,41	0,27	0,34	0,40	0,04	0,39	0,41	0,45	0,26	0,52	1,00		
I78	0,19	0,25	0,23	0,26	0,15	0,22	0,26	0,04	0,26	0,35	0,27	0,17	0,24	0,11	0,33	0,23	0,18	1,00	
I82	0,03	0,13	0,10	0,17	0,17	0,10	0,29	0,20	0,22	0,19	0,07	0,19	0,25	0,22	0,45	0,18	0,22	0,44	1,00

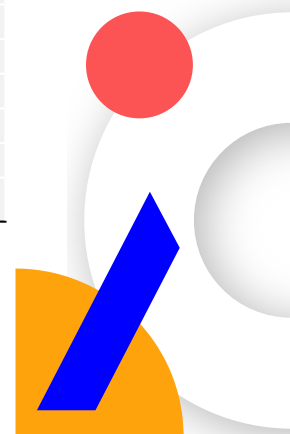


Table 9. Correlations between the Self-Control Items

	I2	I4	I10	I14	I20	I25	I29	I34	I39	I49	I59	I61	I68	I74	I84	I86
I2	1,00															
I4	0,30	1,00														
I10	0,10	0,19	1,00													
I14	0,35	0,38	0,24	1,00												
I20	0,37	0,51	0,22	0,38	1,00											
I25	0,20	0,22	0,19	0,37	0,19	1,00										
I29	0,22	0,07	0,19	0,28	0,10	0,26	1,00									
I34	0,22	0,23	0,14	0,36	0,22	0,25	0,27	1,00								
I39	0,30	0,34	0,12	0,32	0,38	0,22	0,20	0,22	1,00							
I49	0,28	0,16	0,12	0,24	0,17	0,19	0,24	0,26	0,13	1,00						
I59	-0,04	0,14	-0,08	-0,07	0,12	-0,11	-0,11	0,07	-0,07	-0,02	1,00					
I61	0,31	0,23	0,15	0,45	0,27	0,39	0,08	0,41	0,18	0,29	-0,02	1,00				
I68	0,17	0,37	0,35	0,50	0,48	0,28	0,21	0,38	0,31	0,27	0,07	0,51	1,00			
I74	0,12	0,40	0,41	0,37	0,43	0,35	0,22	0,26	0,33	0,14	0,13	0,24	0,41	1,00		
I84	0,19	0,36	0,18	0,29	0,22	0,19	0,14	0,18	0,18	0,15	-0,07	0,25	0,25	0,21	1,00	
I86	0,19	0,56	0,28	0,41	0,53	0,23	0,08	0,23	0,30	0,19	0,03	0,28	0,41	0,40	0,40	1,00



Factor Analysis (FA)

As for the Factor Analysis (FA), a separate Confirmatory FA was carried out for each of the profiles following the structure proposed by Marston's model.

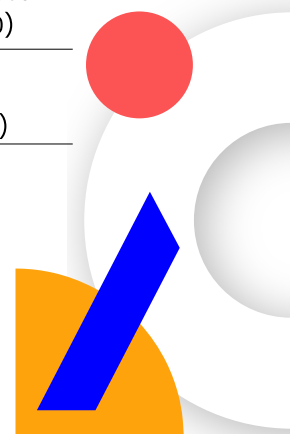
The extraction method was the Weighted Least Squares method with mean and variance adjusted (Weighted Least Square Mean and Variance Adjusted (WLSMV) with the five axes as factors to be extracted. Barlett's test of sphericity and Kaiser's KMO test revealed a positive result.

Table 10 shows a summary of the results on PA obtained in the study of 2021. The Risk, Extroversion and Self-Control axes show a similar structure in the Natural and Adapted profiles, with the items with the highest and lowest factor loadings being the same in both profiles. The Norms dimension showed the highest number of items whose saturations did not reach the point of saturation.

Table 10. Internal validity, factorial loadings, 2021 Study

	R	E	P	N	S
	Natural profile				
Highest load	Bold (0,710)	Popular (0,763)	Satisfied (0,728)	Susceptible (0,621)	Scrupulous (0,708)
Lower load	Demanding (0,286)	Cheerful (0,337)	Pleasant (0,374)	Obedient (0,159)	Cold (0,035)
Lower than the cut *	1	0	0	4	1
	Role profile				
Highest load	Bold (0,840)	Popular (0,708)	Satisfied (0,695)	Susceptible (0,620)	Scrupulous (0,660)
Lower load	Demanding (0,325)	Cheerful (0,325)	Pleasant (0,349)	Obedient (0,269)	Cold (0,091)
Lower than the cut	0	0	0	2	1

* Number of items with factor loadings below the cut-off point of 0.3.





The 2021 study also delved into the fit of the structure found for both the Natural and Adapted Profiles (Table 11). Several indices were used: χ^2 and its associated p-value, the root mean square error of approximation (RMSEA), the Tucker-Lewis index (TLI) and the comparative fit index (CFI). RMSEA showed adequate values on the structures found indicating that there is no misfit in the structures found. In the structures found. The CFI and TLI did not reach the normative cut-off points. But, since these indices measure the degree of perfect fit, what they indicate is the potential for improvement of the structure, rather than the existence of mismatch. One study of the modification indexes revealed that a possible one could be that the items Calm and Patience of the Patience dimension weighed on the Extroversion dimension. Another possible modification would be to move the Obedient item from the Norms axis to the Patience axis or change the item Indecisive (originally in Norms) to the Self-Control axis.

Table 11. Internal validity, fit indices, Study 2021

Profile	χ^2			RMSEA			OFI	TLI
	Value	DF	p	Value	p	IC		
Natural	8723,45	3559	<0,001	0,04	1,000	0,04–0,04	0,67	0,66
Role	8783,19	3559	<0,001	0,04	1,000	0,04–0,04	0,67	0,66

df, Degrees of freedom; RMSEA, Root Mean Square Error of Approximation; CFI, Comparative Fit Index; TLI, Tucker-Lewis Index.

Differential Item Analysis

Differential Item Analysis (DIF) allows detecting whether an item is biased in favor of or against a certain group. An item shows differential functioning when the probability of responding to it is different according to the group of, even when the trait level is the same. The study conducted in 2021 investigated the DIF of the adjectives as a function of the sex of the evaluatee (male and female). Two procedures were used for this purpose. The first was Mantel-Haenszel Chi-square (MH- χ^2), a non-parametric method based on the direct item scores and the direct item direct item scores and the total test score. The second method used was Lord's χ^2 .

This is an IRT-based method that allows for the detection of differential functioning uniform and non-uniform. Out of the sample of 1,090 subjects analyzed in this study, 36% were male and 64% female.

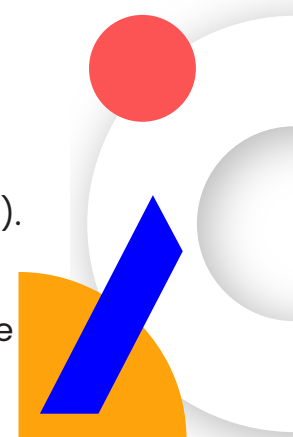
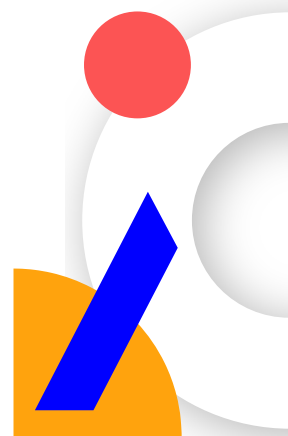




Table 11 shows the items flagged as differential functioning by at least one of the methods and whose effect size was high (B) or severe (C). The last column indicates which group it favors. As can be seen, out of the 86 adjectives that make up the PDA, only 11 of them showed DIF related to sex. The Risk axis was the one in which more items were found with DIF. At the axis level, it can be observed that the items with DIF favoring one of the other group are compensated, with the exception of the Norms axis, where the two items detected favor the men's group. On the Patience axis no item was found with DIF and a significant effect size.

Table 12. Item differential functioning, Sex, Study 2021

Dimension	Descriptor	MH		Lord		Favors
		FDI	TE	FDI	TE	
Risk	Competitive	Yes	C	Yes	C	Men
Risk	Brave	Yes	C	Yes	C	Women
Risk	Decided	Yes	B	Yes	C	Women
Risk	Agresive	No	C	Yes	C	Men
Extroversion	Popular	Yes	C	Yes	C	Men
Extroversion	Unwrapped	Yes	C	Yes	C	Women
Norm	Diplomat	Yes	C	Yes	B	Men
Norm	Skeptic	Yes	C	Yes	C	Men
Self-control	Human	Yes	C	Yes	C	Women
Self-control	Scrupulous	Yes	C	Yes	C	Men
Self-control	Logical	Yes	C	Yes	B	Men





Conclusions on test reliability and validity

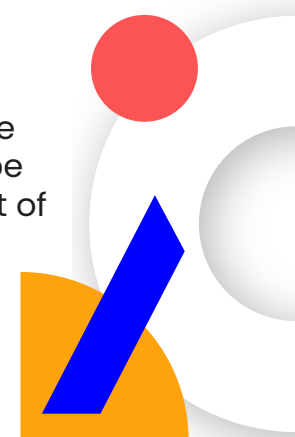
By way of summary, the main findings on the scientific support of the PDA Assessment test are presented.

Reliability:

- In terms of Internal Consistency measured through the Cronbach's alpha coefficient, all the scales showed adequate results. Cronbach's alpha coefficient, all the scales showed adequate results, which leads to the conclusion that the items of each axis measure the corresponding trait. The same can be concluded by observing the omega coefficient.
- The scale of Conformity to Norms is the one that presents the lowest values in terms of consistency, measured both with the α coefficient and the ω coefficient. This result is found in both profiles. However, it should be noted that this value is, in all cases, adequate and this axis can be considered reliable.
- All the axes are reliable for assessing women and men in terms of their Natural Profile, with the Natural Profile being slightly more accurate in women. Natural Profile, with the Extroversion axis being slightly more accurate in women and the Risk axis in men.
- As for the information on the axes, all of them cover the basic trait range of -2 to 2, the highest being the Risk axis being the most accurate when the trait level is high.

Validity:

- The correlations of the items within their own scale resulted high which is a good indication of the structure of the test.
- Confirmatory PA was performed separately for each type of profile and following Marston's model. Marston's model. In general, it can be concluded that the items have good factor loadings and that the fit of the two structures is adequate.





Regarding Item Functioning:

- The 2021 study revealed that there were eleven items with DIF and a high effect size, when studied as a function of gender.
- The Patience axis shows the least DIF. None of the adjectives used favor men or women more.

Standardized Test Evaluation Questionnaire (CET-R)

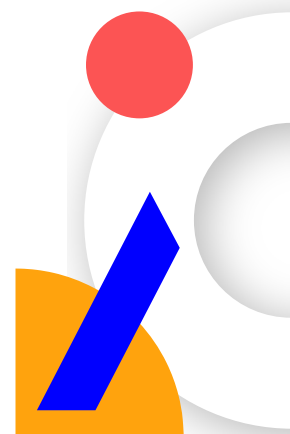
In order to systematize the results obtained for the PDA Assessment tool, the Standardized Test Evaluation Questionnaire (CET-R) was applied. Standardized Test Evaluation Questionnaire (CET-R; Test Commission, Official College of Psychologists). The CET-R is a model of test quality evaluation that defines a series of theoretical practical and/or psychometric quality criteria. Tests are evaluated following a standardized procedure that is easier to interpret than statistical results.


The following are the results based on the most updated analyses of the tool as of the date of publication of this paper. However, it should not be lost PDA Assessment is a tool that is constantly being studied and revised.

General aspects of the test

The PDA Assessment Test has a high quality test in terms of the necessary materials, with a software application is simple and attractive for the test taker. In addition, it has a wide variety of documents that help the reader to understand the technical and statistical intricacies of the test.

In addition, PDA Assessment has a good theoretical basis, based on Marston's model, which is still one of the great personality models.. The descriptors used in the test were also extracted from this author's theory. Specific analyses have been carried out on these items, obtained data on their difficulty, their validity and their ability to discriminate within the corresponding scale. As for the timing of the evaluation, the instructions given to the evaluatee are clear and inform both the test as well as how to answer in the specific phases of the test, minimizing the possibility of free interpretation.





Likewise, the instructions on how to administer the test are clear while those related to the scoring and interpretation of the test are much more complex, requiring specific software in the first case, and specialized training in the second. On the other hand, in most cases the answers of the test taker are recorded directly by the online assessment platform used to apply PDA Assessment, making the process of recording answers somewhat automatic.

In terms of bibliography, PDA International is constantly reviewing its manuals, updating the methodological references and helping to disseminate the PDA International model.

Table 13. CET-R, evaluation of the general aspects of PDA Assessment

Evaluated aspect	Level	Description
Quality of test materials	★★★★★	Excellent
Quality of the documentation provided	★★★★	Good
Theoretical foundation	★★★★	Good
Development of test items	★★★	Adequate
Quality of the instructions so that the test takers can easily understand the task	★★★★	Good
Quality of instructions for administration, scoring and interpretation of the test	★★★	Adequate
Ease of recording responses	★★★★★	Excellent
Manual bibliography	★★★★	Good
Item analysis data	★★★★	Good



Test Validity and Reliability

In terms of Content Validity, PDA Assessment has an adequate representation of the domain it intends to assess, being one of the aspects to delve more deeply into from a statistical point of view.

The internal structure of the test proved to be adequate, and this aspect was evaluated based on the results obtained from the AF Confirmation test carried out on the items following Marston's model. In the same way, the Differential Functioning of the test items according to sex was studied through different procedures, resulting in the PDA Assessment a suitable tool for its application regardless of the participant's gender.

Another aspect studied by the CET-R is reliability. The PDA Assessment test has been studied in this aspect by means of several coefficients, taking into account the sex of those evaluated and the information functions proposed by the IRT.

The internal consistency of the test can be considered adequate. In part, thanks to the large sample used in the studies that evaluated this aspect. Also because several coefficients were used to evaluate it (i.e., alpha coefficient and omega coefficient). Moreover, on average, the reliability coefficients were higher than 0.80.

The study of the information functions (IRT approach) was also conducted in a large sample, giving a better basis for the results obtained. The results can be considered adequate.

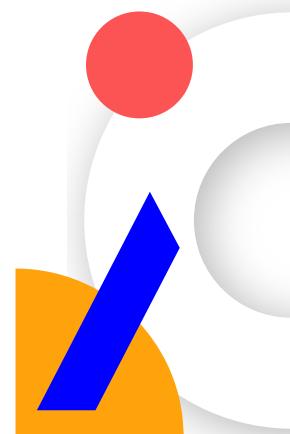


Table 14. CET-R, evaluation of the general aspects of PDA Assessment

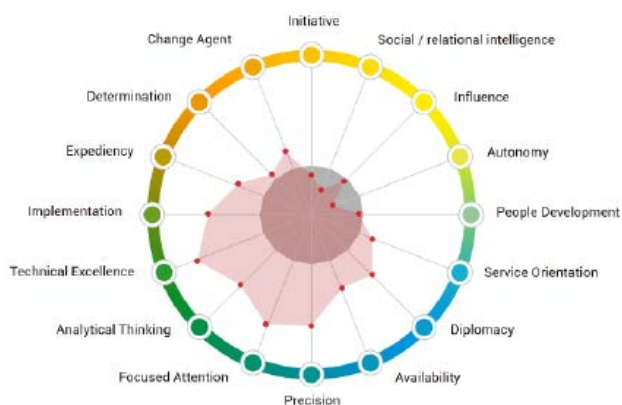
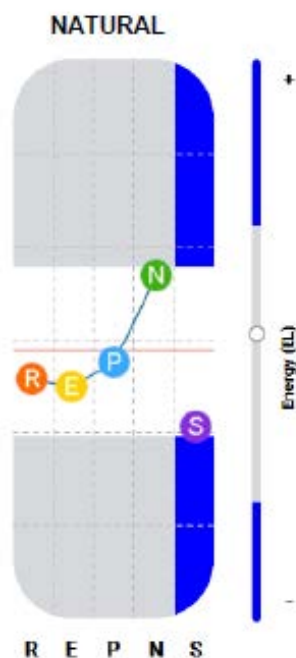
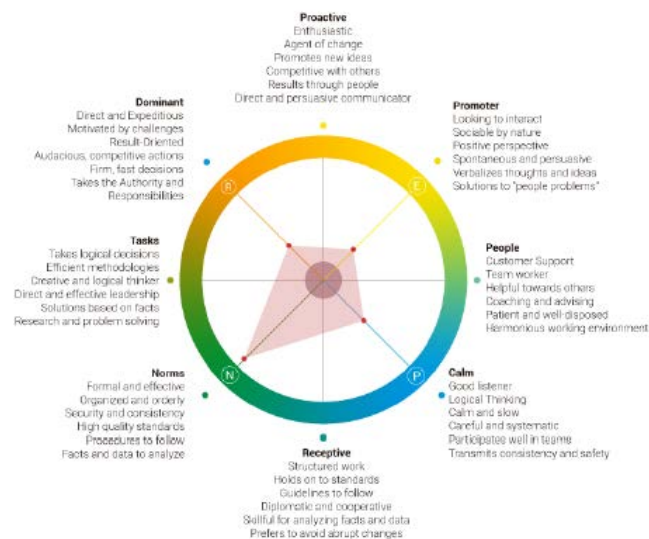
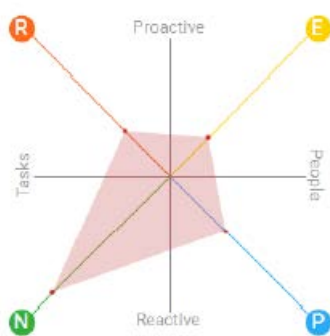
Evaluated aspect	Level	Description
Content validity	★ ★	Adequate, with some deficiency
Internal structure	★ ★ ★	Adequate
Differential Performance of Items	★ ★ ★	Adequate
Internal consistency	★ ★ ★ ★	Good
TRI Reliability	★ ★ ★	Adequate



PDA REPORTS

PDA International offers the possibility of obtaining different reports on the profile of the person being evaluated in order to manage their talent and develop their skills. There are different reports depending on the objective of the evaluation. At examples of all the reports can be accessed through the PDA International Consulting Portal ().

International (<https://pdainternational.net/productos/pda-assessment/>). All reports are accompanied by descriptions and graphs that allow for a deeper understanding of the evaluated (Figure 4).



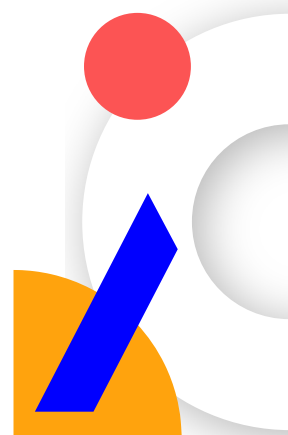


A The following is a brief description of the eight main types of reports:

- **Behavioral Profile Report.** This report details the person's Behavioral Profile and allows us to delve into different aspects such as his or her leadership style, decision making, etc.
- **Job Compatibility Report (Individual).** This report shows the compatibility of the evaluated person with one or several positions already predefined or designed by the client.
- **Job Compatibility Report (Group).** This report shows the compatibility of several positions already predefined or designed by the client.
- **Compatibility with Competencies Report (Individual).** This report speaks of the compatibility of the evaluated person and the selected competencies. The competencies can be generic, of a certain profile or custom-made.
- **Compatibility with Competencies Report (Group).** This shows the compatibility between each of the evaluated persons and the selected competencies.
- **Group Trend Report.** This report shows the data necessary for the vector analysis of a group of people with data at group and individual level.
- **Leadership Matching Report.** This report shows the key aspects that any leader should any leader must take into account to ensure good communication and consolidate their relationship with their collaborators.

An important aspect is the PDA Assessment test, which offers the possibility of relating the person's tendencies with aspects of the company that may be of interest.

For example, the PDA Assessment test makes it possible to analyze a person's "Job Compatibility". The "Job Match" is an estimate of the degree of overlap between a person's behavioral tendencies and aspects of the company that may be of interest.





In cases where the company's interest is not focused on a particular position but rather on matching a person with a set of aptitudes. The study of "Compatibility by Competencies". Some of the generic competencies against which the individual's profile can be checked are "Flexibility", "People Development" or "Initiative", although "Initiative", although there is a much broader catalog. In addition, tailor-made competencies can be designed according to the objective of the particular organization.

Finally, it is also possible to study the "Leadership" tendencies of the person interviewed by analyzing his or her management style. The aim here is to describe how the person performs when he/she is in charge of people, either out of necessity or responsibility.

