ASSESSFIRST
WE MAKE SUCCESS PREDICTABLE

BRAIN

Interpretation Guide

Introduction

Our mission at AssessFirst is to allow our clients to assess the potential of candidates and employees alike. This assessment relies on understanding three essential pillars: what a person can do (their reasoning skills), what they want to do (their motivations) and the way they will do it (their personality). This mission inspires us to develop a modern and fully accessible assessment platform.

BRAIN, our reasoning skills test which had proved accessible so far, began to reach its limitations: it demanded significant testing time (20 mins), was available only on desktop browsers, and comprised a set of tedious questions that provided no stimulation for test-takers. We set out to completely overhaul BRAIN and engineer a radically modern and significantly smarter test.

What you'll learn from this guide

We've created this document to detail both the construction and interpretation method for the BRAIN test. It's divided into three parts:

- *The first part* breaks down the structure of the test: characteristics, theoretical foundations, calculation method and advantages.
- *The second part* delves into the details of each element of a BRAIN assessment report: global potential, preferred tasks, behavioral style, decision-making, and learning style.
- *The third part* explains how BRAIN integrates into the AssessFirst app: predictive models and success prediction.

For additional information on AssessFirst tests, we encourage you to reach out to our team.

01

BRAIN

TEST DESIGN

CHARACTERISTICS

TEST DESIGN

CHARACTERISTICS

BRAIN was developed by AssessFirst in 2020. It was designed to assess the **general cognitive ability** of an individual—also known as the "*g* factor"—which is the best single predictor of the capacity to succeed in a professional context, for almost all positions and roles. It was engineered based on 3 design principles, aimed at satisfying the needs and expectations of both clients and candidates:

- A mobile-friendly interface
- An adaptive framework that adjusts to the taker's ability
- A stimulating and engaging experience

Structure

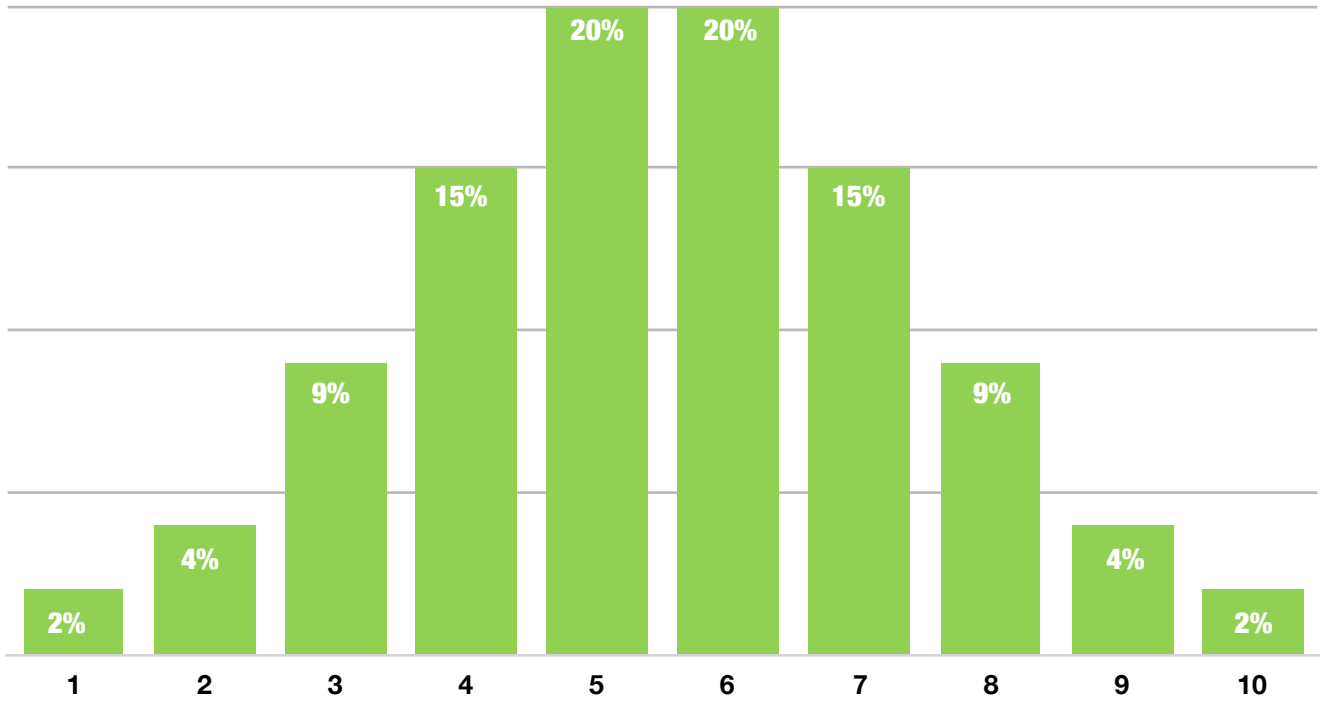
BRAIN is a general test, without subdivisions or themes. It requires users to complete a series of logical figures, within a limited amount of time. Instead of a multiple-choice approach, the user builds each answer by combining the available elements on the screen. The test's adaptive structure (Computer Adaptive Testing, or CAT) ensures the level of difficulty of each figure is adapted to the user's real performance, which means each user will benefit from a personalized experience. In brief, the CAT model works as follows:

- The first test item for all users is of medium difficulty
- The following items will be selected based on the user's responses
- If the user answers correctly, the following item will be more difficult
- If the user answers incorrectly, the following item will be less difficult
- The test ends when the user responds consistently to questions of a similar level of difficulty

The test is scored on a scale from 1 to 10, with 1 being the minimum and 10 the maximum. It uses integer scoring, without decimals. The graph below illustrates the distribution of the 10 possible scores across the general population. *How the graph should be read: only 2% of the population achieves a score of 10; 15% achieve a score of 7, etc.*

CHARACTERISTICS

Distribution of BRAIN scores



Test duration

As a result of BRAIN's adaptive model, different users will answer a different number of questions and the duration can vary slightly from user to user. However, most candidates will answer between 8 and 12 items, for an average duration of 10 ± 3 minutes.

THEORETICAL FOUNDATIONS

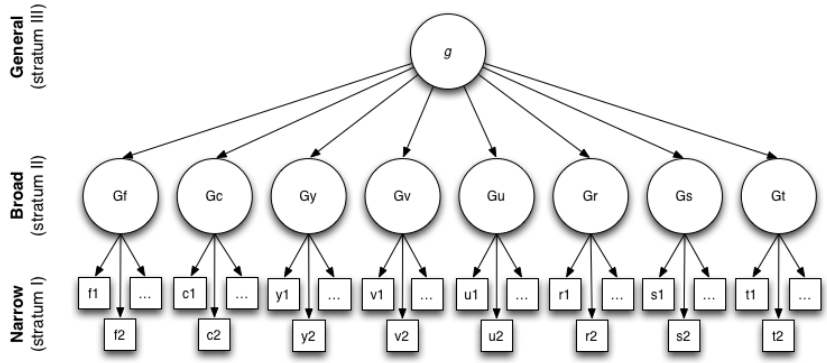
TEST DESIGN

THEORETICAL FOUNDATIONS

BRAIN is built on models of the **general intelligence factor**, or "*g* factor," such as those developed by Spearman (1904) and Cattel, Horn and Carroll (1997), which are the authority in the field of occupational psychology today.

Unlike its predecessor, which distinguished between four different types of reasoning (verbal, analogical, abstract and numerical), the new BRAIN focuses its analysis on a single general intelligence factor. This evolution is based on two main principles. On one hand, the assessment of specific abilities provides no increase in predictive validity. As demonstrated by Ree, Earles and Teachout (1994), an assessment of *g* alone is sufficient in predicting job performance, and testing for specific abilities (such as numerical or verbal) does not provide additional information on a candidate's potential for success. Additionally, as demonstrated by Carroll's hierarchical model of intelligence (1993), specific reasoning abilities are strongly intercorrelated, and correlated to a general intelligence factor.

On the other hand, although we cannot deny the value of gathering all possible data on a test-taker's capacity to process information of different types, the excessive duration and arduousness required for such an assessment cannot be justified in light of its predictive power. It is useless to measure additional dimensions, however interesting, as they only contribute to lengthen the test needlessly. We have therefore chosen to prioritize better user experience and shorter test duration.



Scientific References

Carroll, J. (1993). *Human Cognitive Abilities*. Cambridge University Press. https://bit.ly/3aFBk8k

Ree, M.J, Earles, J. & Teachout, M. (1994). Predicting job performance: not much more than *g. Journal of Applied Psychology*, 79(4), 518-524. https://bit.ly/35o6pwt

Spearman, C. (1904). General intelligence objectively determined and measured. *The American Journal of Psychology*, 15(2), 201–293. https://bit.ly/3bLoPcL

CALCULATION METHOD

TEST DESIGN

CALCULATION METHOD

BRAIN is built on the **item response theory** (IRT) methodology, which is superior to classical test theory (CTT), more commonly used in testing.

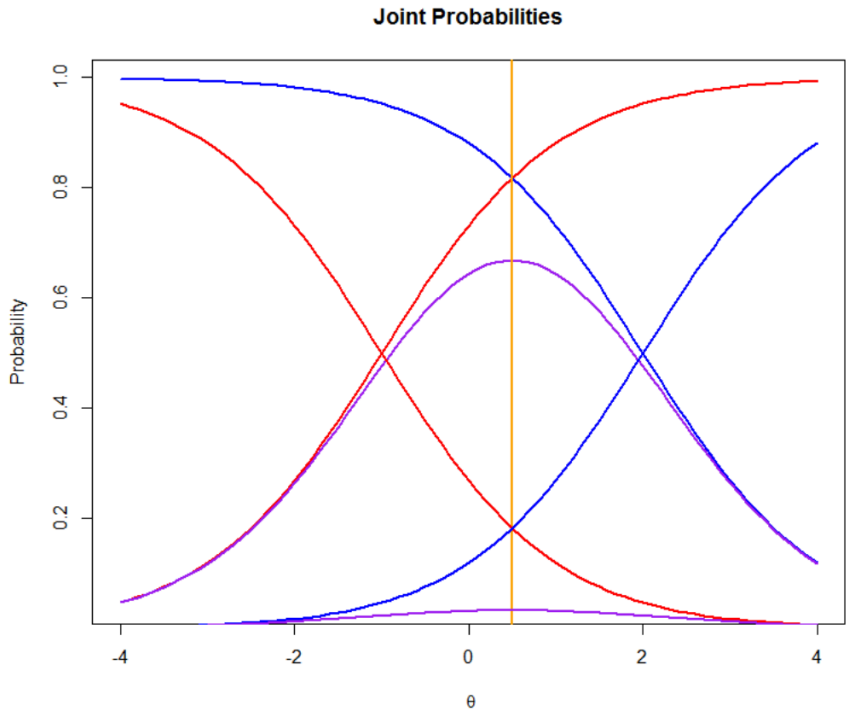
Advantages of IRT

- Each test item is independent, which allows the test to be updated regularly without calling into question the overall solidity of the test.
- IRT measurement is more reliable than CCT measurement, with fewer test items: it allows for increased quality with a lower number of questions.
- The quality of test items is independent of the sample in which they are validated.

What does this mean for test-takers?

As it is exclusively a scoring technique, it does not influence the way test items are presented to users. This allows test-takers to be assessed reliably, spending less time on the questionnaire itself.

$$I(\theta) = a_i^2 \frac{(p_i(\theta) - c_i)^2}{(1 - c_i)^2} \frac{q_i(\theta)}{p_i(\theta)}$$



ADVANTAGES

TEST DESIGN

ADVANTAGES

Our BRAIN reasoning test has numerous advantages, including:

Adaptive assessment

The adaptive model used in BRAIN (Computer Adaptive Testing, or CAT) enables each item presented to a user to be adapted to their level and to their performance on previous items, which results in a tailored test for each user. This also allows us to 1) more rapidly identify the level of the candidate, 2) avoid failure-induced frustration, therefore improving user experience, and 3) reduce the likelihood of answer leaks and cheating, since no two candidates will answer the same questionnaire.

Equitable by design

Brain was designed mobile-first. This approach addresses the increasing demand of candidates to apply for jobs and complete recruitment tests on mobile devices. Additionally, BRAIN was created with neutral content only—that is non-verbal content, where the colors of elements are unrelated to the solution of each figure. This increases test accessibility for all users, including takers with disabilities such as dyslexia or color-blindness.

Intercultural mindset

The neutral content used in BRAIN means test items require no translation or cultural adaptation.

Gamified approach

Although BRAIN is not a game, it leverages game-like interactions and motivations: real-time feedback, manual construction of answers, item level adapted to each user, and personalized test walkthroughs. This approach increases candidate engagement, all while ensuring the psychometric validity of the tool.

Backed by science

As demonstrated by Ree, Earles and Teachout (1994), an assessment of the *g* factor alone is sufficient in predicting job performance, and the inclusion of specific abilities (such as numerical or verbal) does not provide additional information on a candidate's potential for success. It is therefore useless to measure additional dimensions, however interesting, as they only contribute to lengthen the test.

02

BRAIN

ASSESSMENT REPORT

GLOBAL POTENTIAL

ASSESSMENT REPORT

GLOBAL POTENTIAL

An individual's global potential is determined by **two elements**:

Global score

The global score is measured on an integer-only scale, from 1 (minimum) to 10 (maximum). It measures the general cognitive ability of an individual (the *g* factor). It determines:

- Learning abilities
- The ability to handle complex tasks

Therefore, the closer the score is to 10, the higher the individual's potential for significant professional advancement.

Speed

The speed refers to the reasoning rapidity of an individual. It is represented by the gauge surrounding the circle with the global score. The fuller the gauge, the longer the person spent on the test. In the example below, the time spent on the test is average.

GLOBAL POTENTIAL

Three complementary indicators are also included in the assessment of a person's global potential:

Preferred tasks

This provides insight on the level of tasks that the individual is capable of handling:

- Simple tasks: Capacity to perform habitual and well-ingrained tasks.
- Intermediate tasks: Capacity to work autonomously.
- Complex tasks: Capacity to comprehend new and strategic subjects.

Decision-making

This provides insight into the individual's decision-making style based on the time they take to decide. It can be:

- Quick: They require a short amount of time
- Reasoned: They require an average amount of time
- Prudent: They require a significant amount of time

This aspect is detailed in the "Decision-making" section, further in the report.

Learning Style

This provides insight into the way in which a person learns. Four styles exist:

- Innovate
- Deepen
- Experiment
- Implement

Each style is defined in the "Learning Style" section.

BEHAVIORAL STYLE

ASSESSMENT REPORT

BEHAVIORAL STYLE

BRAIN goes beyond analyzing cognitive level, and takes into consideration the way in which test-takers answered questions. In the “Behavioral Style” section, we analyze the way a person behaves when answering both correctly and incorrectly. There are four styles, on two axes:

- Horizontal axis: Alternative routes / Perseverance
- Vertical axis: Effort / Natural talent

Alternative Routes / Perseverance scale

This scale pinpoints the way a person behaves when in difficulty.

- *Perseverance:* indicates a person’s tendency to dedicate more time to addressing issues when they are unsure of the results.

- *Alternative routes:* indicates a person’s tendency to avoid being blocked by difficulties, and a penchant for moving onto other subjects or approaches.

Effort / Natural talent scale

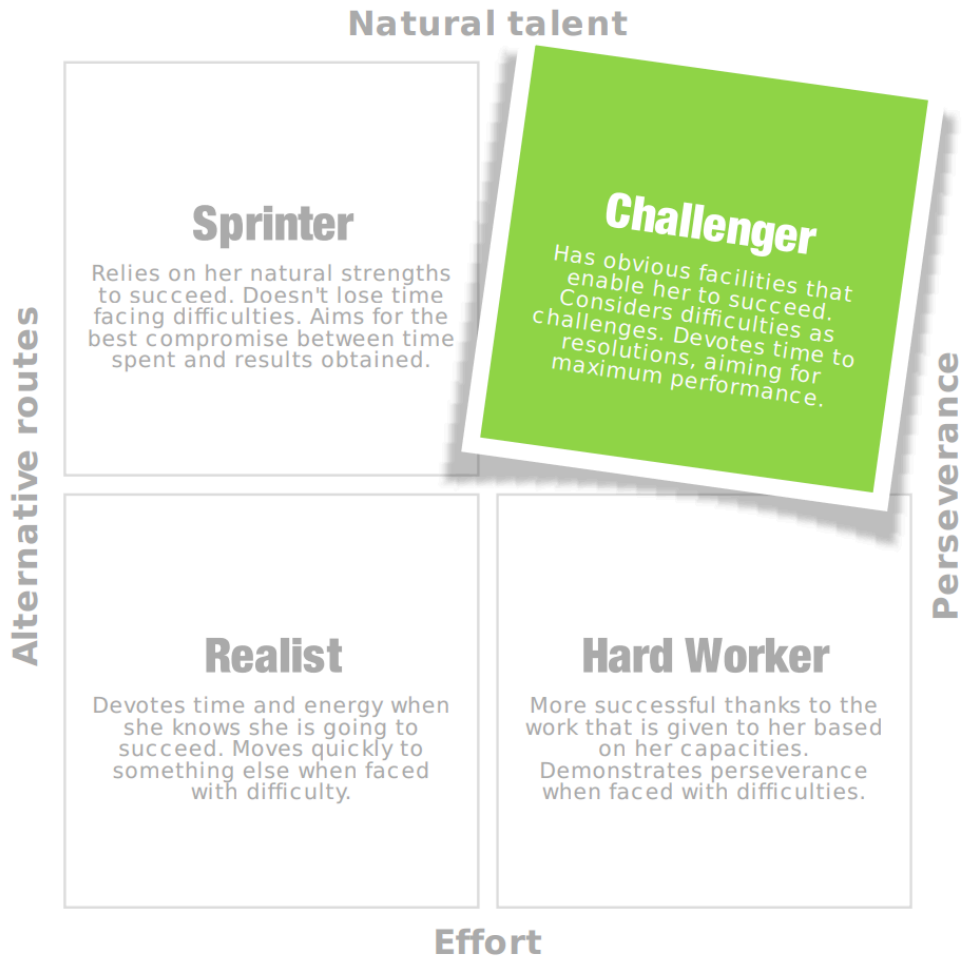
This scale identifies how a person arrives at the right decision:

- *Effort:* indicates a person’s tendency to succeed when they apply themselves and dedicate time to a given subject.
- *Natural talent:* indicates a person’s tendency to succeed by quickly finding answers without dedicating too much time to analysis.

BEHAVIORAL STYLE

The four behavioral styles are:

- Sprinter (natural talent / alternative routes)
- Challenger (natural talent / perseverance)
- Realist (effort / alternative route)
- Hard worker (effort / perseverance)



DECISION-MAKING

ASSESSMENT REPORT

DECISION MAKING

BRAIN assesses the positive factors an individual could leverage for decision making, as well as the risk factors that could come into play. Positive factors are expressed in terms of potential: “Low”, “Medium”, or “High”. They help identify the person’s decision-making strengths, as follows:

Handling complexity
This factor measures the person’s capacity for taking into consideration the complexity of the information during the decision-making process.

Decision speed
This factor measures the person’s capacity to make decisions rapidly, on a daily basis, or whether they require significant time to decide.

Precision
This factor measures the quality of the decisions made by a person. The higher the potential, the less the person is likely to be wrong in their judgements.

POSITIVE FACTORS

		Potential →	
Handling complexity		Medium	
Decision speed			High
Precision		Medium	

DECISION MAKING

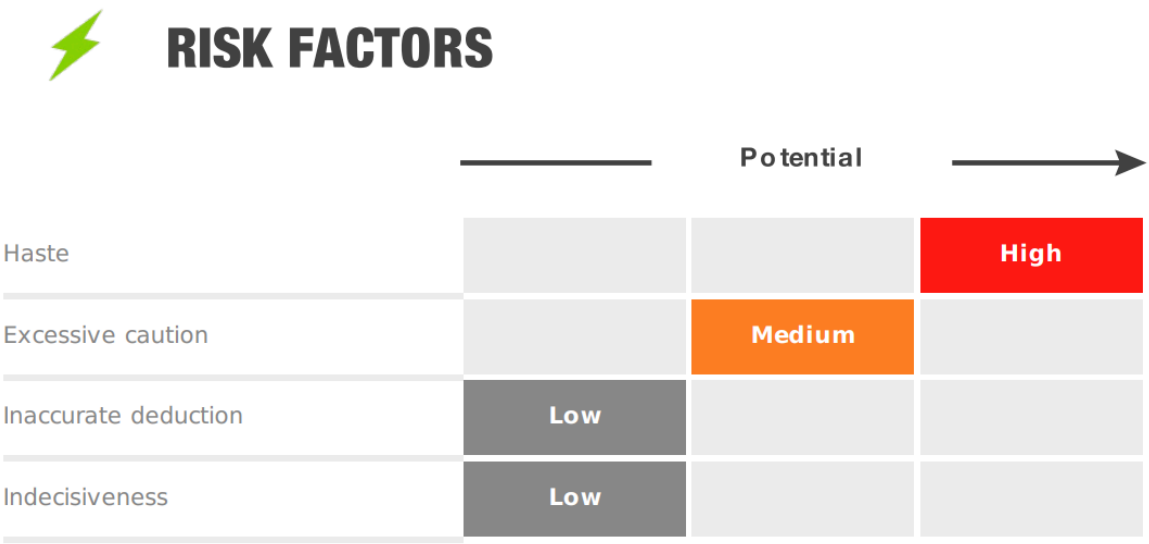
Risk factors are elements that can impact the quality of a person's decision-making. This section assesses what the most likely source of error is for that person. Risk factors are expressed for each person in terms of potential: "Low", "Medium", and "High".

Haste
This factor measures the tendency to make mistakes because decisions are made too quickly.

Excessive caution
The opposite of haste, this factor measures the tendency to invest too much time validating decisions and being excessively prudent.

Inaccurate deduction
This factor manifests itself when a person has a tendency to make erroneous analyses and interpretations. This means the person has a tendency to think they are right, but their reasoning is faulty.

Indecisiveness
This factor manifests itself when a person has a strong tendency to skip test questions without answering.



LEARNING STYLE

ASSESSMENT REPORT

LEARNING STYLE

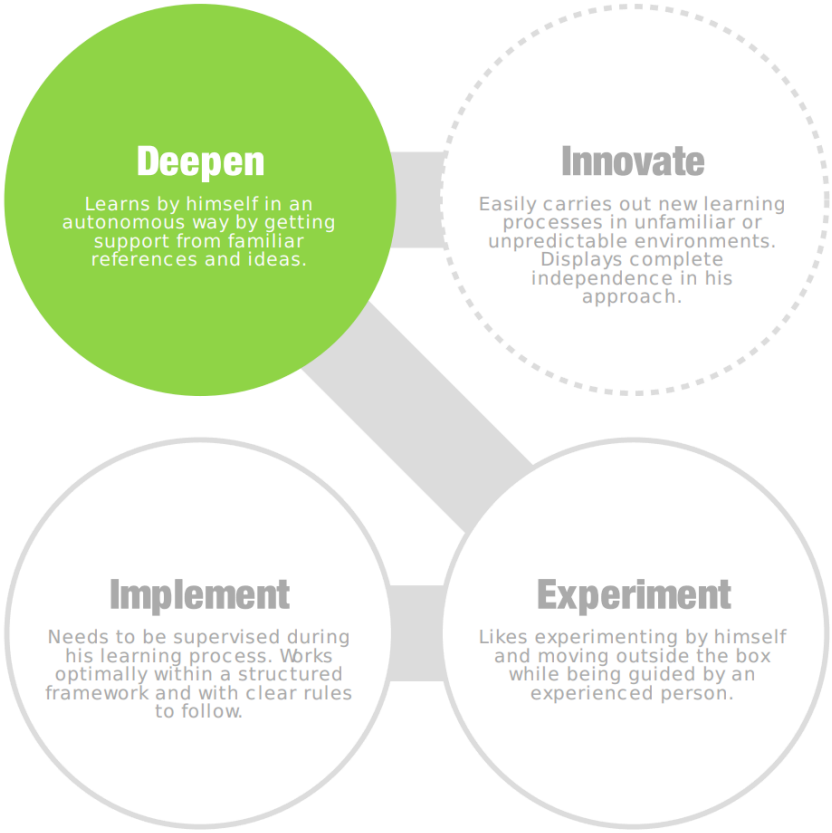
Lastly, BRAIN provides an overview of a person's learning style through four possible strategies.

People on the right half of the chart learn through experimenting. They need to try things out to learn from their experience, even if it means often making mistakes.

On the left half we find more prudent individuals, who will more often listen to instructions and attempt to follow established rules closely. They require a clear framework.

People on the top half tend to be self-learners. They understand and assimilate new information easily, and can therefore progress on their own.

People on the bottom half require guidance when learning. This can mean getting recommendations or advice from their peers. They progress better in a structured environment where they can obtain support.



03

BRAIN

ASSESSFIRST APP

PREDICTIVE MODELS

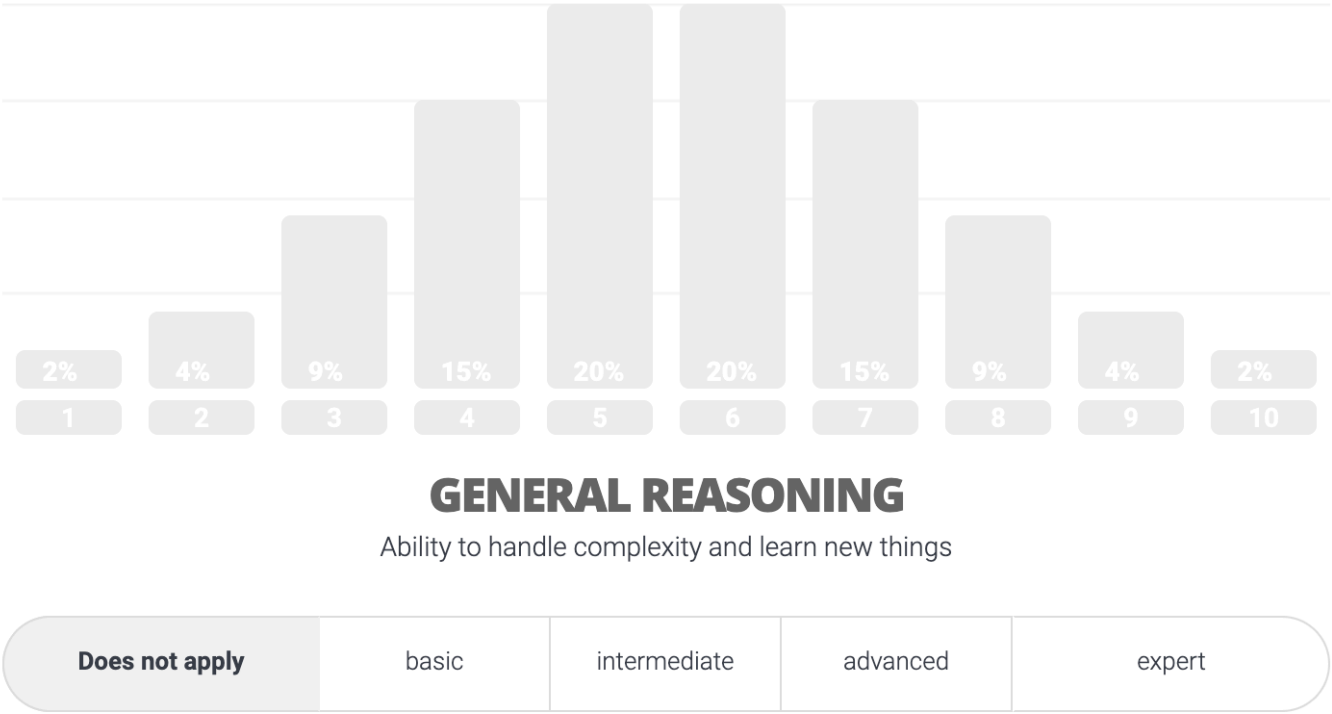
ASSESSFIRST APP

PREDICTIVE MODELS

When creating a predictive model, users can incorporate BRAIN results by indicating their expectations in terms of global BRAIN score. To help establish the score, 5 levels are given as indicators: “does not apply”, “basic”, “intermediary”, “advanced”, and “expert”. The scores are linked to score ranges as follows:

- **Does not apply:** BRAIN results won’t be considered in the predictive model.
- **Basic:** a score between 4 and 10 is required
- **Intermediary:** a score between 6 and 10 is required
- **Advanced:** a score between 7 and 10 is required
- **Expert:** a score between 8 and 10 is required

The percentage of the population matching the selected level is displayed on the graph. For example, when an “expert” level is required, only 15% of the population will be expected to be a strong match on the BRAIN dimension.



PREDICTING SUCCESS

ASSESSFIRST APP

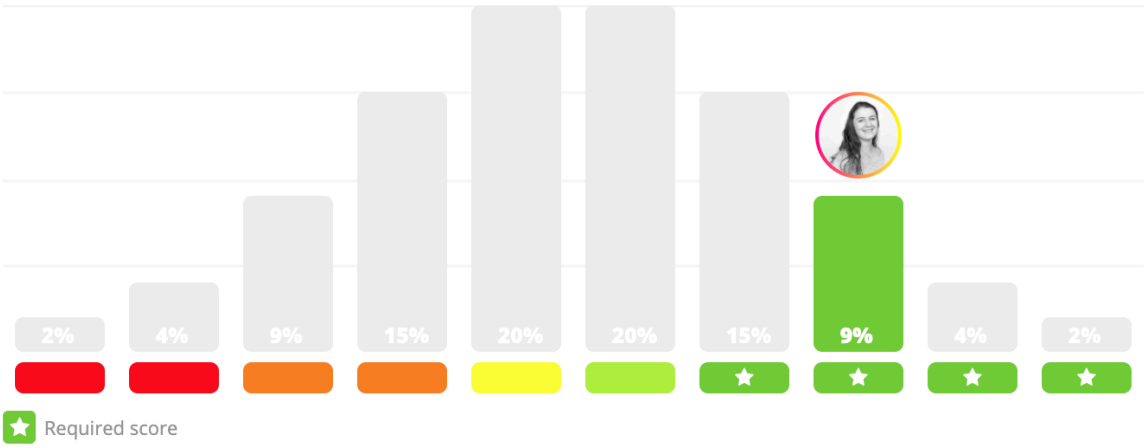
PREDICTING SUCCESS

To view a person's match rate with a predictive model that takes BRAIN results into account, head to the "Predict Success" tab on the app.

Required scores for the selected model are marked with a star ★ :

The candidate's profile picture is displayed on the graph, directly above their score.

In the example below, the candidate obtained a score of 8. This model requires a score of at least 7. Only 6% of people will obtain a score higher than this candidate.



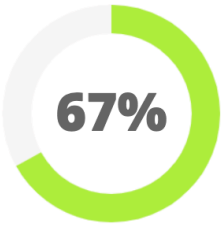
PREDICTING SUCCESS

BRAIN match rates for predictive models are indicated as percentages. The closer the match is to 100%, the better the individual's cognitive skills will be adapted to the requirements of the role.

BRAIN match rates are calculated based on two factors:

- **Global BRAIN score:** The match rate is based on the comparison between the individual's global score and the required score for that predictive model.

- **Speed:** The individual's speed when answering the test is used to calibrate the match rate obtained on the basis of the global score.



BRAIN
Reasoning

OVERALL SCORE
Progress continuously

ANALYSIS OF GENERAL LEVEL

John Doe has a variety of resources that allow him to make wise decisions. He knows how to manage information of a certain complexity and pays attention to the reliability of his choices. But what characterises him the most is the speed of his decisions. He needs to advance quickly and make his choices without hesitating too long on the options before him.

CONTACT US

AssessFirst

Get in touch

This guide was designed as an overview of the design, development and interpretation methods of the new BRAIN reasoning test. For more information, reach out to our team:

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