

TECHNICAL MANUAL & USER GUIDE

SMART GAME – Analogies

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1. Introduction

SMART GAMES is a series of assessments measuring cognitive abilities, with its research and development starting in 2022. This series of assessments offers a *gamified* alternative to Central Test's **SMART** assessments (which assess logical, numerical and verbal reasoning).

SMART GAMES aims to create entertaining and psychometrically accurate games, providing a comprehensive view of an individual's cognitive abilities.

SMART GAME - Analogies is a module within this series which specifically assesses verbal reasoning. This cognitive aptitude assessment measures an individual's ability to manipulate and reason with verbal information. The assessment assesses "analogical" reasoning, which is the ability to reason by analogy and requires an individual to understand logical relationships and discern between different concepts, meanings, similarities or differences.

Higher levels of verbal reasoning are associated with:

- Improved communication skills and increased effectiveness in convincing or persuading others.
- The ability to confidently tackle tasks that require understanding complex arguments or learning new concepts.
- Working accurately and efficiently with verbal, written, and oral information.
- Better identification of errors in verbal reasoning or arguments.

Here are the benefits for users of **SMART GAME - Analogies**:

- **Quality and Reliability**: The item bank used for this assessment comes from **SMART**, ensuring high measurement quality.
- **Adaptability**: The items are categorised into 8 difficulty levels and are calibrated to adapt to the candidate's response level in real-time. This allows for a personalised assessment, where the difficulty of the questions automatically adjusts to the candidate's skill level.
- **Candidate Experience**: The gamification of the assessment aims to reduce the feeling of frustration among candidates, making the evaluation process more engaging and less stressful.
- **Performance-Based Assessment**: The candidate's score is calculated by considering their performance on the items and the level of difficulty attained, providing a more detailed assessment of their capabilities.

- **Customisable Reports:** The results are presented in easy-to-interpret reports that can be customised according to the administrator's needs, facilitating informed decision-making.

In this technical manual and user guide, you will find useful information about the development, theoretical background, benefits of gamification, and practical applications of **SMART GAME - Analogies**.

2. General Description and Areas of Application

Wechsler (1944) describes intelligence as “the aggregate or global capacity of the individual to act purposefully, to think rationally and to deal effectively with his environment.” Given that general intelligence measures are the most reliable predictors of job performance, **SMART GAME - Analogies** has been specifically designed to assist HR professionals or managers in recruiting, selecting, and developing employees (Meta-analysis by Smith et al., 2016). This section details the specifics of the assessment to ensure its fair and reliable use.

2.1. Main Areas of Application

The **SMART GAME - Analogies** assessment is useful in a wide range of professional environments and is adaptable to various industries and job levels. It is particularly relevant in recruitment and selection, where it enables human resources managers to accurately assess candidates' verbal reasoning skills, regardless of the specific position or industry. The assessment can be utilised throughout an employee's career but is also suitable for beginners. See Table 1 below, for details on the various applications of **SMART GAME - Analogies**.

Table 1. Applications of SMART GAME - Analogies.

Recruitment	Internal Mobility	Selection
To recruit individuals with high intellectual abilities, which in turn leads to better returns on investment for your organisation.	To identify your employees' reasoning abilities, thereby allowing you to predict which areas they will be most likely to excel in, and thus validate their potential to succeed on tasks and in future projects.	To give a clear picture of a student's aptitude and learning ability, which in turn helps in selecting candidates at your college or B-school.

SMART GAME - Analogies can also be combined with other professional assessments to acquire a more complete profile of individuals in specific roles. For example, it may be beneficial to combine **SMART GAME - Analogies** with the **PROFESSIONAL PROFILE 2©** assessment in a recruitment context to consider personality in a professional setting, or with the **IMMERSION©** assessment to predict the candidate's interest alignment with a specific career.

2.2. Questionnaire Structure

SMART GAME - Analogies is an adaptive gamified assessment composed of items from **SMART**. Participants are required to complete a total of 10 verbal analogies, with a maximum of 30 seconds allocated to solve each analogy. The items are distributed across 8 difficulty levels, based on data from the IRT analysis of each item conducted during the design of the **SMART** assessment (N = 2023). For more information on the development of the **SMART** assessment items, please refer to the **SMART** technical manual and user guide.

During the assessment, items are randomly presented to the candidate to match their estimated skill level. If a candidate correctly answers an item, a slightly more difficult item will be presented next, and conversely, if they fail, an easier item will appear next. Depending on the accuracy of their response, they will also receive feedback, either congratulatory or encouraging.

During the assessment, candidates may take one two-minute break between questions. The assessment also offers two lifelines:

- **Bonus Time:** provides an additional 30 seconds to complete the analogy presented.
- **Switch:** allows changing of the current question to another one without losing points.

However, the candidate can only use one of the two lifelines during the game.

2.3. Administration, Languages, and Special Requirements

SMART GAME - Analogies is administered online and is compatible with any modern computer operating system including Windows, macOS, and Linux. Like other modern and gamified assessments, it can be conducted remotely and without supervision. However, if standardised evaluation groups are required, these can easily be set up. Reports are generated online only.

The questionnaire is currently available in English, French, and Spanish.

SMART GAME - Analogies is designed to be accessible and usable by a wide audience, regardless of age, assessment/video game experience, or industry sector. The assessment interface is intuitively designed to guide respondents at every step, with

clear instructions and a simplified response format (drag-and-drop or by simply double-clicking on the chosen response element).

Additionally, the assessment offers candidates the ability to adjust the display settings to their preferences, such as text size or display speed. This option is available by clicking at the top left of the screen. It is also possible to play the game in full-screen for better immersion.

Administrators are encouraged to contact the test publisher for guidance on administering the questionnaire to individuals or groups with special requirements.

2.4. Test Security

An assessment like **SMART GAME - Analogies** is highly resistant to cheating. Firstly, due to its adaptive structure and the random selection of items, the likelihood of two individuals seeing the same questions is very low, making it impossible to memorise or copy answers from another candidate. Additionally, administrators have the option to activate proctoring to ensure that the candidate is taking the assessment by themselves and that their attention is focused on the screen. This feature is activated with the candidate's consent and it takes periodic photographs of the participant during the session.

Moreover, to prevent the questionnaire from being leaked onto the internet, it is impossible to copy and paste from the screen whilst the session is taking place. Finally, to maintain the authenticity of the questionnaire and not penalise the candidate in case of a technical issue, the assessment is configured to automatically pause if the candidate remains inactive for more than two minutes. If the candidate does not return before the end of the pause, then the assessment ends. Note that if a pause has already been taken, the assessment will end immediately.

2.5. Administration Instructions

In most cases, the assessment will be taken remotely and without supervision through online access. However, in the case of taking the assessment within a supervised setting, the following guidelines should be applied.

Although instructions for completing **SMART GAME - Analogies** are presented on-screen, it is important for administrators to communicate with the candidates. Prior to starting the assessment, administrators should verify that candidates understand

what they are required to do and give the candidates the opportunity to seek clarification regarding the assessment.

The instructions given are the same for every individual. Standardised instructions ensure that all participants are exposed to similar conditions during the assessment process, to ensure that it is fair and objective and that assessment conditions do not directly or indirectly give any individual or group an advantage.

Further tips:

- If candidates have questions after the assessment session has started, the administrator should try to answer them without disturbing other candidates.
- If an administrator suspects that a candidate's lack of understanding is due to language proficiency, the administrator should ask the candidate to take the assessment in the language they are most comfortable with.

Candidates receive a notification to take the assessment via email, which includes an embedded web link and log in information. The web links to the assessment are password-protected and unique to each candidate's account. Expiration dates can be set to ensure that candidates complete the assessment within the specified timeframe. It is also possible to configure the invitation so that the assessment is performed using the same IP address that was used to access the assessment. The time taken to complete the assessment is also recorded for tracking purposes to allow administrators to ensure that the candidate did not rush through it.

2.6. Technical and Security Issues

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

2.6.1. Respecting the Ethical Charter

As a publisher of online assessment tools, *Central Test* respects the legal conventions of French Labour Law and the regulatory provisions resulting from the law of 6 January 1978 pertaining to information technology, files and freedoms: Declaration N°1834067.

Additionally, as of 25th May 2018, *Central Test* complies with the GDPR (General Data Protection Regulation) regulations made by the European Parliament & Council.

Assessment results and personal data cannot be shared with third parties without explicit consent from the candidate. Candidates have the right to access their results and the assessor must grant them access when requested. Furthermore, if the candidate requests it, all data must be permanently deleted. To do so, the candidate must contact either the organisation or *Central Test* directly.

2.6.2. Confidentiality and Security of User Data

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

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

2.6.3. Hardware Architecture and Server Availability

Central Test uses Google Cloud Platform, offering hosting on the same infrastructure that Google uses internally for products such as its search engine. All servers used are located within the European Union and are run on a Unix/Linux type operating system, featuring:

- 6 Compute Engines
- Load Balancing
- High performance of the SSD disk (680,000 IOPS)
- A 2-hour Incident Response Time
- Monitoring and assistance 24/7/365

Access to the server administration is restricted to an IP address and is password-secured. Data exchanges are secure. *Central Test's* application has been tested on and is compatible with the following browsers:

- Firefox 35 or above
- Google Chrome 30 or above
- Safari 11 or above
- Microsoft Edge 12 or higher

2.6.4. Computer-generated Reports

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

2.7. Supply, Conditions and Availability

Conditions of supply and availability for **SMART GAME - Analogies** vary from country to country. However, the following points generally apply:

- **SMART GAME - Analogies** can be ordered online, or by contacting any *Central Test* customer service representative or local partner worldwide (customer@centraltest.com).
- For information on **SMART GAME - Analogies** prices and related products and services, contact any *Central Test* customer service representative or local partner worldwide.

When using **SMART GAME - Analogies**, adherence to certain conditions and precautions is required to ensure an accurate and fair evaluation of candidates:

- The assessment must be administered in a controlled, quiet environment free from distractions to allow candidates to fully concentrate. They should have access to suitable equipment, such as a computer or tablet with a stable internet connection, and a screen that allows for comfortable reading of the instructions and items.
- Administrators must be trained not only to understand the tool's operation but also to interpret the results correctly. This technical manual and user guide is

available for individuals trained in using **SMART GAME - Analogies**. For more information on training, please contact *Central Test*'s customer service or one of its partners.

- The confidentiality of candidate data must be rigorously protected in accordance with current regulations, and the assessment must be used ethically, ensuring a fair and non-discriminatory interpretation of the results. Finally, it is recommended to offer feedback to candidates after completing the assessment, by sending the report and discussing it, to help them understand their results and their implications.

3. Test Construction and Gamification

3.1. Game Setting

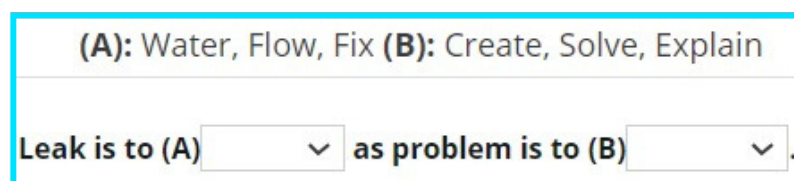
The gameplay of the **SMART GAME - Analogies** assessment is designed to provide an immersive and engaging experience while assessing candidates' verbal reasoning skills. In this scenario, participants find themselves aboard a spaceship where the communication signal with the main base is lost. Their mission is to restore this contact by answering a series of verbal analogies.

As the candidate correctly answers the questions, the strength of the signal gradually increases, symbolising the restoration of communication with the space base. The goal is to fully restore the signal, thereby ensuring the success of the mission. This immersive

approach is designed to make the assessment experience more enjoyable and less stressful for participants. By integrating gamification elements, such as the space context and progression toward a clear goal, the **SMART GAME - Analogies** assessment aims to reduce the stress often associated with assessments while maintaining a high level of accuracy in skill evaluation. The objective is to ensure that candidates remain motivated and engaged throughout the assessment, to obtain results more representative of their true abilities, while making the overall experience more positive and enjoyable.

3.2. Item Conception

For the development of **SMART GAME - Analogies**, we used calibrated items from the **SMART - VERBAL** assessment (Figure 1).



(A): Water, Flow, Fix (B): Create, Solve, Explain

Leak is to (A) as problem is to (B) .

Figure 1. Example of a SMART - VERBAL item.

The items from **SMART - VERBAL** consist of analogies that require linking elements from one verbal structure to another element of a different verbal structure while applying two principles.

These items were created by the research and development team following the guidelines outlined by Thompson and Weiss (2011). In summary, these are:

- The development of an item bank.
- The pretesting and calibration of items.
- Integration into the system of computerised adaptive tests, using Item Response Theory (IRT).

3.2.1. SMART – Verbal Item Parameters

According to the 2PL model, the item parameters represent the discrimination and difficulty of the items. The difficulty of the items provides an indication of where, on a skill scale from -3 to 3, the items from **SMART - VERBAL** operate. Low scores indicate that an item is easy, while high scores indicate that an item is difficult. The discrimination of the items shows how well an item can differentiate the competency levels of the candidates.

Table 2. Estimation of the SMART - VERBAL item parameters.

Question Number	Item Discrimination	Item Difficulty	Question Number	Item Discrimination	Item Difficulty
1	1.027082473	0.252038292	49	0.339549466	-2.163052987
2	1.693056616	0.152188886	50	0.945007805	1.454578595
3	1.585186399	0.144500242	51	0.459870261	-3.85843976
4	0.958461024	0.375435271	52	0.459148322	3.799808528
5	0.831342235	0.902966652	53	1.367693294	1.904804066
7	1.407273171	0.022354129	54	0.847711126	1.068686733
8	0.831582352	-1.320025566	57	-0.250315813	2.375646415
9	1.619390138	-0.399940094	61	0.97562687	-2.043021455
10	0.937646638	-0.559981	62	1.130343245	-0.346029617
11	0.599837091	0.963461134	63	1.673422174	1.380770677
12	1.323162151	-1.187850656	64	1.235840531	3.351233929
13	0.902776918	3.456863664	66	0.870745381	-3.013347338
14	0.93947746	-0.212287812	67	0.499702784	-2.194416826
15	0.69961467	0.290043603	68	1.240667329	-1.137991805
16	0.601184535	1.745697945	69	0.296131478	-0.570020124
18	1.229916347	-1.40814677	70	1.540765061	0.531093208
19	1.830064869	-1.056455887	72	0.57531922	1.142851097
20	1.438411092	-0.675765086	73	1.565114291	0.434415473
21	0.755820555	-0.701658575	75	0.607225751	-2.953924656
22	0.205529859	0.925360402	76	0.693901386	-3.065734143
23	0.949633613	0.161182263	77	0.452559712	0.276480019

25	0.854406474	-1.261444779	78	1.473883523	-0.878448473
27	1.373671825	-1.879138312	79	1.385319224	-1.995434419
28	1.399861176	-0.660310869	80	0.242322872	-2.2028254
29	0.656097221	-2.002108382	81	0.788679783	2.985353285
30	1.584803696	0.139887537	82	0.527796836	1.624799524
31	1.35787989	-0.11871718	83	1.07074316	1.42628429
33	0.305062409	1.417964386	84	0.4230321	-3.10040447
34	0.482334222	-0.852574154	85	1.00089639	-0.574240244
35	0.382763112	3.995698078	87	0.467251122	-1.039008603
37	1.139766928	-2.31720733	88	1.01451942	0.262235675
38	0.92246214	-0.691054692	89	0.38372786	-2.983360573
39	1.63323708	-0.06632227	90	0.751511921	3.047297387
40	0.976739066	1.108839465	91	0.700126485	1.768805371
41	0.491183878	-1.285840385	94	1.357934822	-0.869338958
42	1.264247671	0.979491686	95	2.071849249	-0.677915171
44	0.956138882	-0.560430667	96	1.004803199	1.308177482
45	0.695139339	1.793256833	97	0.657365074	0.00395581
48	1.21107769	-0.948139057	98	0.82166786	-0.518626212

For more information on the development, standards, and reliability of the **SMART - VERBAL** items, please refer to its technical manual and user guide.

3.2.2. Difficulty Levels

Based on the previously mentioned item parameters, 8 difficulty levels have been established to support the gamification of the assessment while maintaining good discrimination. The table below lists the **SMART - VERBAL** items that have been selected to constitute each difficulty level, along with the associated item difficulty.

Table 3. SMART - VERBAL item selection for SMART GAME - Analogies and their difficulty levels.

[Level 1] SMART GAME - Analogies					
Question Number	Item Difficulty	Question Number	Item Difficulty	Question Number	Item Difficulty
58	-4,741999283	84	-3,10040447	75	-2,953924656
47	-4,323763305	76	-3,065734143	37	-2,31720733
51	-3,85843976	66	-3,013347338		
17	-3,268770051	89	-2,983360573		

[Level 2] SMART GAME - Analogies

Question Number	Item Difficulty	Question Number	Item Difficulty	Question Number	Item Difficulty
80	-2,2028254	61	-2,043021455	27	-1,879138312
67	-2,194416826	29	-2,002108382	18	-1,40814677
49	-2,163052987	79	-1,995434419	8	-1,320025566

[Level 3] SMART GAME - Analogies

Question Number	Item Difficulty	Question Number	Item Difficulty	Question Number	Item Difficulty
41	-1,285840385	78	-0,8784484732	28	-0,6603108686
25	-1,261444779	94	-0,8693389583	85	-0,5742402438
12	-1,187850656	34	-0,8525741535	69	-0,5700201236
68	-1,137991805	21	-0,7016585754	44	-0,5604306673
19	-1,056455887	38	-0,6910546925	10	-0,5599809996
87	-1,039008603	95	-0,6779151707	98	-0,5186262123
48	-0,9481390566	20	-0,6757650861	9	-0,3999400944

[Level 4] SMART GAME - Analogies

Question Number	Item Difficulty	Question Number	Item Difficulty	Question Number	Item Difficulty
62	-0,3460296165	71	0,09521902334	77	0,2764800189
14	-0,2122878121	30	0,1398875368	15	0,290043603
31	-0,1187171805	3	0,1445002421	4	0,3754352714
39	-0,06632227033	2	0,1521888855	73	0,4344154731
55	0	23	0,1611822628	70	0,5310932076
97	0,003955810402	1	0,2520382917		
7	0,0223541291	88	0,2622356747		

[Level 5] SMART GAME - Analogies

Question Number	Item Difficulty	Question Number	Item Difficulty	Question Number	Item Difficulty
32	0,6905365162	54	1,068686733	33	1,417964386
5	0,9029666515	40	1,108839465	83	1,42628429
22	0,9253604016	72	1,142851097	50	1,454578595

11	0,9634611341	96	1,308177482
42	0,9794916859	63	1,380770677

[Level 6] SMART GAME - Analogies

Question Number	Item Difficulty	Question Number	Item Difficulty	Question Number	Item Difficulty
82	1,624799524	45	1,793256833	57	2,375646415
16	1,745697945	53	1,904804066		
91	1,768805371	74	1,928881635		

[Level 7] SMART GAME - Analogies

Question Number	Item Difficulty	Question Number	Item Difficulty	Question Number	Item Difficulty
13	3,456863664	81	2,985353285	90	3,047297387
64	3,351233929				

[Level 8] SMART GAME - Analogies

Question Number	Item Difficulty	Question Number	Item Difficulty	Question Number	Item Difficulty
52	3,799808528	86	4,228309335	24	4,493755568
35	3,995698078	6	4,401353835		

3.3. Validation and Additional Information

3.3.1. Internal Reliability

To ensure that the assessment, in its new gamified version, remains reliable, analyses of internal reliability have been conducted. Internal reliability indicates the extent to which the items of a scale are consistently measuring the same construct. It is measured by calculating Cronbach's alpha (α) for each factor. This metric averages all possible inter-item correlations without relying on a single reliability indicator, which can contain large amounts of error. Cronbach's alpha ranges from 0 to 1, with a recommended minimum value of 0.7 (1 being equal to perfect reliability (Nunnally, 1978)). Values above 0.9 are considered excellent, from 0.7 to 0.9 are considered good, from 0.6 to 0.7 are acceptable, from 0.5 to 0.6 are poor, and values below 0.5 are unacceptable.

The reliability of **SMART - VERBAL** was calculated on the French-speaking sample and shows an overall reliability of 0.79, indicating that the scale has good internal consistency and is very reliable.

3.4. Gamification of Psychometric Assessments

Gamification incorporates game elements into non-game contexts to motivate users during repetitive and/or mundane tasks.

Deterding et al. (2011) describe the use of mechanisms such as points, leaderboards, and relevant challenges to make ordinary tasks more engaging. Thus, the gamification of traditional psychometric assessments allows for the collection of richer behavioural data, offering a more complete and objective view, and reducing biases in decision-making. There are two types of gamification:

- **Gamified Assessment:** Some game elements are added to give the feel and appearance of a game, but the psychometric properties of the traditional assessment remain unchanged.

- **Game-Based Assessment:** Game elements become an integral part of the assessment model. The psychometric quality remains unchanged.

SMART GAME - Analogies is a gamified assessment. The psychometric evaluation remains traditional, and game elements are added: feedback, lifelines, instructions, and an interactive context.

Gamification allows for:

- **Uncovering the potential of recent graduates:** Gamified assessments enable the identification of actual skills and competencies, such as teamwork, problem-solving abilities, and intellectual curiosity, all of which are key factors for success in a job role.
- **Discovering profiles with diverse experiences:** This type of assessment highlights transferable skills and the agility of profiles that may not completely align with the job offer.
- **Rejuvenating the brand image:** The recruitment process becomes more interactive, making the company's image more appealing.
- **Reducing social desirability bias during assessment administration:** This approach helps in obtaining more genuine responses from candidates, as the gamified environment can reduce the pressure to conform to perceived desirable behaviours.

4. Scoring and Norms

4.1. Percentile Rank Scores and the Scoring Method

In order to provide an easily interpretable score that enables an efficient indication of where an individual's score lies in comparison to the normed population, scores on the **SMART GAME - Analogies** reports are presented as percentile rank scores.

Individuals receive a score between 0 - 10, indicating their percentile rank and denoting how the individual has performed in relation to the scores of the comparison group, thereby allowing meaningful comparisons to be made. This is visually represented on a graph displaying the individual's percentile rank as a percentage between 0 - 100. For example, a score of 7.4 equates to a percentile rank of 74%. A percentile rank of 74% indicates that the individual has scored higher than 74% of the comparison group; it does not mean that the individual has scored 74% in the assessment. The comments in **SMART GAME - Analogies** follow this scoring methodology while providing an extensive interpretation of the individual's reasoning skill across 7 levels of ability. For example, lower percentile rank scores will be accompanied by comments indicating that the individual may have difficulty performing tasks which require the associated reasoning skill, while higher percentile rank scores are accompanied by comments indicating that the individual has an advanced level of reasoning ability.

4.2. Norms

Norms help to compare an individual's score on an assessment with the scores of others who completed the same assessment, usually under similar conditions. These individuals who took the assessment at the same time are representative of the population for which an assessment is intended and are therefore referred to as the norm group.

With norms, assessment developers and psychologists are able to establish comparisons between individuals and make more objective decisions. Norms also help HR Managers determine an individual's suitability for a role relative to the job specification, evaluate an individual's abilities across a range of desired competencies, identify an individual's skill deficits and allow them to tailor training for development and establish objective metrics of performance. Norm groups also enable attributing meaning to assessment scores and to quantify an individual's performance, and level of an attribute or trait relative to their peers.

Table 4. SMART GAME – Analogies norms by gender.

Gender	Sample Size	Mean	SD	Median	Min	Max	Rank	SE
Male	282	3.40	1.39	3.30	0.40	10.0	9.60	0.08
Female	185	3.38	1.38	3.30	1.00	8.50	7.50	0.10

Table 5. SMART GAME – Analogies norms by age group.

Age	Sample Size	Mean	SD	Median	Min	Max	Rank	SE
18-25	20	3.54	2.10	3.50	0.8	10	9.2	0.47
26-33	66	3.62	1.31	3.50	1.5	7.7	6.2	0.16
34-41	98	3.44	1.45	3.50	1	8.5	7.5	0.15
42-29	93	3.31	1.29	3.10	1	8.1	7.1	0.13
50+	112	3.39	1.29	3.30	1	7.7	6.7	0.12

Table 6. SMART GAME – Analogies norms by level of study.

Level of Study	Sample Size	Mean	SD	Median	Min	Max	Rank	SE
Student	7	3.27	1.73	3.5	1.5	6.5	5	0.65
Level 1: Master's, Doctorate, Engineering or Business School, MBA	156	3.70	1.46	3.6	1	10	9	0.12
Level 2: Bachelor's, Master's Year 1	48	3.51	1.19	3.6	1	5.8	4.8	0.17
Level 3: 2 years of professional or university studies	66	3.34	1.25	3.1	1.3	8.1	6.8	0.15
Level 4: High school diploma	42	3.19	1.30	3.0	1.2	6.5	5.3	0.20
Level 5: Vocational training, no high school diploma	24	2.79	1.18	2.8	1	5.6	4.6	0.24

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