“Scientific Screening Test for Gifted Children”

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INTRODUCTION

The **“Huerta del Rey” Scientific Screening Test for gifted children, an Application of the Raven Color Test (CPM),** presented at the IX Latin American Congress: “Giftedness, Talent and Creativity”, in Buenos Aires (October, 2012).

The Scientific Screening Test: The “Huerta del Rey” Scientific Screening Test for gifted children, an Application of the Raven Color Test (CPM), has been developed by the “Huerta del Rey” Research Team composed of: Yolanda Benito, Doctor in Psychology; Dr. Jesús Moro, M.D.; Dr. Juan A. Alonso, Doctor in Educational Sciences and Susana Guerra, Doctoral thesis student.

The Early Identification Screening Test for gifted children of 4,5 and 6 years, was translated into 6 languages and validated in 6 countries by their respective Ministries, Organizations and Universities and led to notable advances in the identification and education of gifted children and also had an impact on the educational legislation of those countries.

We have now created a new screening test for 6, 7 and 8-year old children: “The Huerta del Rey Scientific Screening Test for gifted children, an Application of the Raven Color Test (CPM)” which we consider significantly extends the possibilities for identifying these children.

1. Stages in the identification process:

Nomination and/or screening

This stage seeks to evaluate economically, both in time and cost, which children might be candidates for the process of diagnosis.

Diagnosis – Selection

This stage enables us to select which children require an adapted educational programme. Individualised evaluation is necessary. The objective is to plan the student´s education.

2. What is a screening test?

A screening test, for example in the health field (triage or detection test), is a test which is performed in order to identify the presence of a disease or risk factor for an illness, in general among asymptomatic persons (those who have not manifested symptoms of a disease). In this way, some of the risk factors for an illness can be detected at an early stage which thus enables early treatment or prevention.

Screening or detection tests are widely used in medicine as part of a periodic health examination. For example, in the Public Health system mammography tests are performed to detect breast cancer in women, or Tests such as PSA or similar ones to detect prostate cancer in men.

Screening tests, such as detection tests or triage, are necessary because it would not be advisable, appropriate or possible to perform, for example, a prostate biopsy on all men in order to rule out or confirm prostate cancer. It would also involve unnecessary inconvenience and an unacceptable level of medical expenditure. Screening tests, both in the fields of medicine and education, are the first stage of evaluation and their aim is to cover the entire population.

Those pupils, in the case of education, and those patients, in the case of medicine, who prove positive in the screening test subsequently undergo further tests in order to carry out the final diagnosis.

3. Conditions which must be required of a screening test:

- Diagnostic validity: sensitivity and specificity.
- Efficiency: positive and negative predictive values (Likelihood ratio).
- Reproducibility.
- Safety: not cause damage.

3.1. Validity: sensitivity and specificity.

Sensitivity: this is the likelihood of correctly classifying an individual patient as suffering from an illness. The sensitivity is, therefore, the ability of the test to detect the illness.

Specificity: this is the likelihood of classifying a healthy individual as healthy. For example, the Sensitivity of the rectal examination for detecting prostate cancer is 56.56%. The ability to detect the illness is 56.56%. That is to say, 43.44% who indeed have cancer showed normal examinations. The test correctly identified 56.56% who had prostate cancer.

The validity of the rectal examination as a screening test for detecting prostate cancer is not very good given the low sensitivity (56.56%): 43.44% of the patients who had cancer showed normal examinations. Clearly, this indicates the need to use other, more sensitive markers such as PSA or similar ones. It is obvious, therefore, that the ideal scenario would be to work with high sensitivity and specificity screening tests but this is not always possible.

Another example can be found in the Drug Controls of the Directorate General of Traffic in oral fluid. The initial aim of the DGT for its screening

test was set at obtaining a sensitivity and specificity of over 80% for each and every one of the 13 substances selected. The sensitivity and specificity values define the accuracy of the test.

3.2. Efficiency: positive and negative predictive values (Likelihood ratio).

The efficiency consists of responding to the question: what likelihood do we have of being right with this test? The likelihood ratio offers us this data which also has the advantage that it relates the sensitivity and specificity of the test in a single index. This enables us to use it as a comparative index between different screening tests of the same type.

3.3. Reproducibility.

Reproducibility is the ability of the test to offer the same results when its application is repeated in similar circumstances. It is advisable for the screening test to be simple to apply, accepted by the population in general and that it is economically viable.

4. Why is the application of the Screening Test: "Huerta del Rey Scientific Screening Test for gifted children, an Application of the Raven Color Test (CPM), for the detection of gifted children", important and necessary?

4.1. The identification of pupils means **educational equality** and makes it possible to implement Article 29 of the Convention of the **Rights of the Child:**

1. *"The State Parties agree that the education of the child shall be directed at:*

a) the development of the child´s personality, talent and mental and physical abilities to their fullest potential".

4.2. Teachers´ stereotypes when nominating pupils.

According to documents published by the Ombudsman for Children of the Community of Madrid, it is stated that, worldwide, teachers only correctly identify 50% of gifted children. In Madrid, the teachers identified 44% of these children. On the other hand, they identified as gifted 97% who were not.

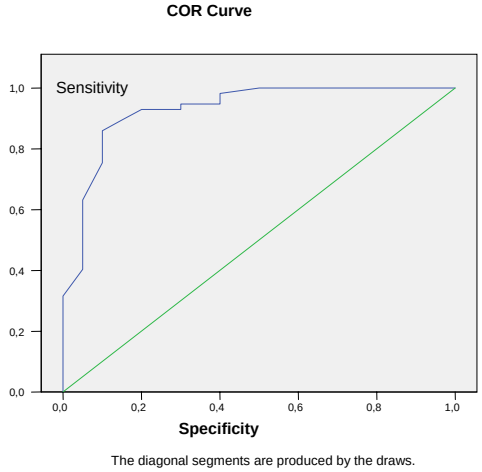
4.3. Currently, from the review of national and international bibliography and their respective manuals, although there are many tests which are marketed and advertised as possible screening tests for the gifted (WNV and the Naglieri Nonverbal Ability Test, SAGES, K-BIT, EDAC, BADYG, etc.), and numerous questionnaires exist for parents and teachers, (the Arocas, Martínez, Martínez and Regadera Questionnaires or the Pérez and López Questionnaire), but only two tests fulfil the scientific validity criteria of a screening test: the Gates Scales and the Empirical Based Screening Test for the Early Identification of 4, 5 and 6-year old gifted children, the latter being the only one recorded which has been internationally validated. In the case of the Gates Scales, no data is provided regarding the efficiency of the test (Diagnostic Likelihood Ratio).

5. Validity Criteria

The "Huerta del Rey" Scientific Screening Test for gifted children, an Application of the Raven Color Test (CPM), offers the following **Validity Criteria:**

- **The sensitivity is 82.4%** (the Confidence Interval at 95% is located between 72.52% and 92.28%). The screening method enables us to identify 82.4% of gifted children.

- **The specificity is 90%** (the Confidence Interval at 95% is located between 76.85% and 100%). The specificity or ability to identify as negative those children not gifted is 90%.



Area below the curve

Variables resulting from the contrast: Raven_1

Area	Error type.(a)	Asymptotic Sig.(b)	Asymptotic confidence interval at 95%	
			Upper limit	Lower limit
.929	.036	.000	.858	1.000

The "Huerta del Rey" Scientific Screening Test for gifted children, an Application of the Raven Color Test (CPM), a triage test for gifted children, **eliminates 88% of the sample.** Only 12% of the children pass the test which has been applied to them. This means that for the second stage only a small percentage passes, so that only the Psycho-pedagogic Evaluation has to be performed on those 12% of the children: thus, the method is both economic and simple to apply. For example, if the screening test were applied to 100 children, 12 of them would prove positive in the screening.

This triage test for gifted children eliminates 88% of the sample. Only 12% of the pupils who are given the test pass (a significant work saving for the diagnosis of gifted children). The triage method does not diagnose all the gifted children in the group (provisionally, it diagnoses 2 out of every 3), so therefore it is an approximate diagnostic method.

Table. The relationship between the I.C.G. [Index of general intelligence from the Wechsler Scale (WISC-IV) and Raven Color Test (I.C.G. – Gifted ≥130)]: a prognosis regarding the sample of a general group with 2.5-3% of intellectually gifted children.

	Gifted	**Non-gifted**	
Screening +	2	10	12
Screening -	1	87	88
TOTAL	3	97	100

The **Diagnostic Likelihood Ratio** is 8.24%. For each child wrongly classified, 8 times more will be correctly diagnosed.

CONCLUSION

The Screening Method presented is extremely simple, objective and reliable. Moreover, another advantage is the minimum economic cost, given that, except for the human resources necessary, the only material which is required are copies of the Raven Color Test (CPM).

The Raven Color Test is widely known and accepted in all countries. It is a test free from cultural influences, apt for applying to socially lower class children, ethnic minorities, children with hearing difficulties, learning difficulties, motor difficulties and language difficulties or for those children who do not know the language of the country.

No language or cultural barriers exist. The “Huerta del Rey” Scientific Screening Test for gifted children, an Application of the Raven Color Test (CPM), makes it possible to detect possible gifted children of 6, 7 and 8 years in ethnic minorities, and those children with hearing, language, learning and motor difficulties and is also valid for children from low cultural classes and for those who do not know the language.

We consider that, at this moment, this Screening Test is the best detection system for gifted children of 6, 7 and 8 years.

The Screening Test will be published in Spanish and English in a special edition of the Journal: Ideacción.

Ideaccion is listed in:

* ISOC data base of the State Council of Scientific Research (CSIC-CINDOC); Spanish Ministry of Education (CD-rom & diskette).
* Bibliographic journal of the Documentary Service of CIDE; Spanish Ministry of Education.
* PSICODOC data base of Psychologists Official Association of the State (CD-rom & diskette).

References

Arocas, Martínez, Martínez y Regadera (2002): Protocolo de detección de sobredotación intelectual. Educación Infantil (de 4 a 6 años). Consejería de Educación y Cultura de la Generalitat Valenciana.

Artola, T; Mosteiro, P; Barraca, J; Ancillo, I; y Pina, J. (2003): EDAC: Escala de Detección de Alumnos con Altas Capacidades. Ed. Albor-Cohs.

Benito, Y. y Moro, J. (1997): Proyecto para la Identificación Temprana de Alumnos Superdotados. Ministerio de Educación y Cultura, Madrid.

Benito, Y. y Moro, J. (2002). Test de screening con base empírica para la identificación temprana de niños de 4, 5 y 6 años con sobredotación intelectual. Madrid, Psymtec Material Técnico.

Comunidad de Madrid (2003): La educación del alumno superdotado. Documento del Defensor del Menor. CAM, Madrid.

Dirección General de Tráfico, DGT (2011): Prevalencia de consumo de sustancias psicoactivas en conductores españoles. Druid-Project WP2Ob. Observatorio Nacional de Seguridad Vial.

Gilliam, J.E.; Carpenter, B.O. & Christensen, J.R. (1996): GATES, Gifted and Talented Evaluation Scales. Pro-ed, Austin, TX.

Johnsen, S.K. & Corn, A.L. (2001): SAGES-2, Screening Assessment for Gifted Elementary and Middle School Students. Pro-ed, Austin, TX.

Kaufman, A.S. & Kaufman, N.L. (1990): K-BIT, Test Breve de Inteligencia de Kaufman. American Guidance Service, Minnesota.

Martínez (2009): Cuestionario de detección de competencias y estilos de aprendizaje.

Naglieri, J.A. (2007): NNAT2, Naglieri Nonverbal Ability Test, Second Edition. Pearson, San Antonio, TX.

Pérez, L. y López, C. (2007): Cuestionario de detección de niños con altas capacidades (3-4 años), (5-8 años) y (9-14 años). Hijos inteligentes ¿educación diferente?. Editorial San Pablo, Madrid.

Pita, S. y Pértegas, S. (2003): Pruebas diagnósticas: Sensibilidad y especificidad. Complexo Hospitalario Universitario de A Coruña.

Raven, J. C. (1976): Coloured Progressive Matrices: sets A, Ab, B. Oxford: Oxford Psychologists Press Ltd.

Raven, J. (1976). Standard Progressive Matrices: sets A, B, C, D, & E. Oxford: Oxford Psychologists Press Ltd.

Raven, J.; Raven, J.C. & al. (2000). Section 3 Standard progressive matrices (including Parallel and Plus versions). Manual for Raven's progressive matrices and vocabulary scales. Oxford: Oxford Psychologists Press Ltd.

Renzulli, J. & al. (2001): Scales for rating the behavioural characteristics of superior students (manual y escalas traducidas y adaptadas por Alonso, J.A.; Benito, Y.; Pardo, C. y Guerra, S. Amarú Ediciones, Salamanca.

Wechsler, D. y Naglieri, J.A. (2006): WNV, Escala No Verbal de Aptitud Intelectual de Wechsler. Pearson (versión española, 2011), Madrid.

Wechsler, D. (2005): Wechsler Intelligence Scale for Children, Fourth Edition (version española). Corral, S. y otros, TEA Ediciones, Madrid.

Yuste, C. (2002): BADYG-E1, Manual Técnico. CEPE, Madrid.

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