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Article

Analysis of the relationship between executive functions and Intelligence in Gifted Student: a pilot study.

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Abstract: (1) Background: Executive functioning is a concept that suggests a scheme of relationship between brain-mind and behavior, through a plan and control of individuals actions on tasks and context. This work is an approach to the study between relationship of abilities (flair) and the execution, between cognitive development and executive functioning as intelligence and creativity and reading writing learning association. The objective is trying to give a definition of neuropsychological profile of Gifted Students; (2) Methods: We studied 20 Gifted Student assessments by a school counselor, under some characteristics as having greater than 125 IQ. The age range was 6:8 to 11:8 from Primary School. Instruments were WISC-V. BRIEF-2 and TTCT; (3) Results: We observed a positive correlation between IQ and Inhibition, that would keep relation with behavioral mechanism (guide work, autonomy, impulse control, ...) of students to develop cognitive and metacognitive abilities as going in-depth in habits, skill, and strategies of intellectual work in the classroom; (4) Conclusions: There is a distance between executive functioning and IQ. Correlations, considering our sample, would express a halfway association between both variables. Association that would be explained for the connection or underlying cognitive mechanism in some factors of variables.

Keywords: Executive functioning; Intelligence; Gifted Students.

1. Introduction

The mind is a result of an emerging brain and it is a requirement but not enough to have mind products and functions. The mind would be a subjective experience that comes from the activity brain that purpose is structure and behavior organization (Self-Knowledge and the context). Mind, intelligence, executive control is the result of:

- Cognitive development under brain structure.
- Learning of interaction context.

Cognitive development is formed about mind functions (attention, perception, memory, judgment-sense, reasoning, ...), in relationship with resolution problems, information processing, creativity… In Cognitive development is important to know, from a neuropsychological analysis, intelligence wouldn't be an exclusive brain property, could be a located function in the lateral prefrontal cortex [1], under research with people with injury in the lateral prefrontal cortex and showed difficulties in plan and executive control.

In any case, Intelligence is in the cerebral cortex, but, according to [2], while temporal, parietal, and occipital structures are the basis of descriptive knowledge (*how are things*), the frontal lobe would be the prescriptive knowledge (*how would-be things and what would have to do to adapt to our needs*). Consequently, the frontal lobe amounts the knowledge we

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have in the experience and consequences, rather, what give us results in the past and what be convenient to the future [3].

The study of the brain and its implications in the reality that surrounds us should be somewhat more present in the educational environment in general, and in the school environment in particular. Modern conceptions of learning and memory recognize the importance of multiple, semi-independent brain circuits [1] which, although interconnected, are different circuits that contribute to different aspects of behavior. Addictive drugs probably compromise mechanisms in various brain regions, which include the targets of dopaminergic innervation, such as the hippocampus, amygdala, and prefrontal cortex [4]; [2].

This work leads to *Executive functioning and Gifted Students: regarding a study sample*, which will continue in specific areas of study of the neuropsychological construct *executive functioning*, and that for this particular work will focus on *the population of Gifted Students*.

Before starting it is convenient to highlight the points in which this work will be organized, understanding and justification of the subject and its relationship with the teaching subject matter, which could be set in four fundamental sections:

1. Understanding why Neuroscience is included in the field of education.
2. Establish the relationship between the study of the brain, intelligence, and its role in learning.
3. Integration of the concept of intelligence and its relationship with the neuroscientific field, starting from the Executive Functions [5]. Likewise, it would seek to contribute how to know, from an evolution and measurement perspective, the values of the two plots, through diagnostic tests such as the use of the WISC-V test, BRIEF-2, Torrance Test (Creativity), among others of interest.
4. Obtain an applied vision and possible implications of the commented aspects for school learning.

Executive Functioning is a construct that aims to understand the network of brain-mind relationships and behavior, through planning and control of individual actions on tasks and context. Executive functions are mental operations, cognitive processes that organize ideas or actions into complex, goal-directed behaviors. Therefore, they are at the base of the processes of adaptation to new situations, maintenance of personal autonomy, behavior in general, and more particularly empathy and social sensitivity or conscience.

In a tight summary, executive functions are processes responsible for the conduction of thought, emotions, and behavioral functions, particularly during the active resolution of novel problems. Thus, having the responsibility for the regulation of manifest behavior, as well as for the regulation of thoughts and affections, it is also purposeful, insofar as it would be in charge of achieving the objectives set, of their assessment and anticipation of results [6].

This work has an approximation character to the study of the relationships between capacities (aptitudes) and the application or execution, between cognitive development and that of executive functioning, as well as the association between intelligence and creativity or with literacy learning. It is done with a sample of boys and girls with high intellectual capacities, understanding that, in them, their aptitudes are diagnosed and that an analysis of relationships between variables can contribute aspects of interest in their personal and academic development.

2. Materials and Methods

It is obvious to express that boys, girls and young people with high capacities are so because, in general, they present great aptitude in measures of intellectual functioning, cognitive flexibility, creativity, and other specific abilities [7].

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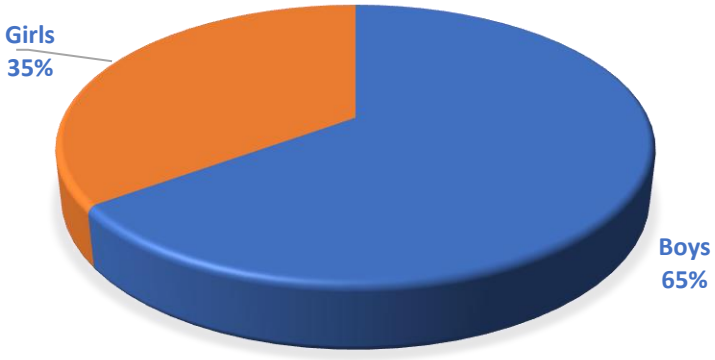
Accordingly, their mean scores on the cognitive aptitude tests will be significantly higher than the rest of their peers in age. Although in some cases, Gifted students may demonstrate divergences on verbal and non-verbal tests, they typically do well on tests, with strengths in the areas of verbal comprehension, visuospatial aptitude, and fluent reasoning. On the other hand, in the areas of working memory and processing speed, although higher than the general average, they tend to obtain lower scores than in the previous three mentioned.

2.1. Participants.

20 cases of mixed gender students (graph 1) with high intellectual abilities are studied, assessed by an Educational Guidance Team, in an area (urban and rural) of the province of Malaga (Spain), the inclusion criteria of this sample being: have an IQ above 125, and present a high performance compared to the level of their peers



Graph 1. Distribution by gender.

The age range is from 6 years 8 months to 11 years 8 months (M = 8 years 3 months) and a gender distribution of 65% boys (13) and 36% girls (7). All of them belong to grades 1 to 4 of Primary Education of a public school.

2.2. Process.

The research design is sectional, descriptive, and retrospective; all the examinations were carried out by psychologists and pedagogues with extensive experience in educational psychology evaluation.

The participants in this study were cognitively assessed using the WISC-V [8], at the request of their teachers, by observing good performance in academic activities and accordance with the Detection Plans of High Intellectual Abilities of the Council of Education of the Junta of Andalucía (Spain). Therefore, the inclusion criteria of the sample subjects were:

1. A score greater than 125, a range greater than two standard deviations from the normal distribution of intelligence.

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2. Teachers' observations regarding high school performance, with their observations and those made through questionnaires from the Ministry (Teachers – Families), following a educational psychology intervention protocol of the Ministry of Education, according to regional and national regulations of Spain.

3. The integration or association with aspects of creativity (criterion for giftedness) and reading and writing as an objective aspect of performance.

2.3. Instruments.

- Weschler Intelligence Scale for children, 5th version –WISC-V. The WISC-V subtest is grouped at four levels of interpretation. Full is based on Verbal Comprehension (VC), Visual-Spatial (VS), Fluid Reasoning (FR), Working Memory (WM) and Processing Speed (PS), Primary Index, Ancillary Index (quantitative reasoning, auditory working memory, nonverbal, general ability, cognitive proficiency), and Complementary Index (naming speed, symbol translation, and storage and retrieval).

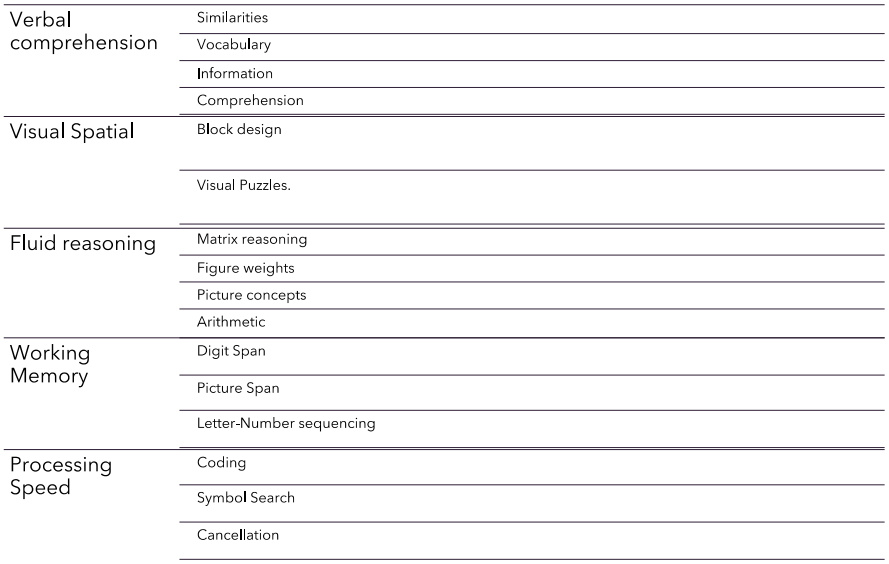

Figure 1. WISC-V Test structure. Adapted from Wechsler Intelligence Scale for Children, Fifth Edition (Kaufman, Raiford, and Coalson, 2016).

Each level contains more than one scale [9]. The full scales, as the same as ancillary ones, have some distinctive features according to a specific group (disorders, learning disabilities, or gifted students) (table 1). In this study, we used Spanish version [10] whose application age is from 6:0 to 16:11.

Table 1. Relationship between the index and specific groups.

INDEX	*SENSITIVE TO …*
Verbal Comprehension	Reading disorders. Math learning disabilities. Speech disorder and Autism disorder.
Visual-Spatial	Math learning disabilities. A strong area in some children with autism.
Fluid Reasoning	Reading comprehension. Math learning disabilities.
Working Memory	Learning disabilities. ADHD. Specific Speech disorder and Autism disorder.
Processing Speed	Learning disabilities. ADHD and Autism disorder.
Gifted Students have strong abilities in Verbal Comprehension, Visual-Spatial, and Fluid Reasoning, with a lower performance average in working memory and processing speed.	

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- Behavioral Evaluation of the Executive Function Scale (BRIEF-2) [11]. BRIEF-2 Assess executive functioning skills in home and school environments in children and adolescents ages 5-18 years. BRIEF-2 is a test with Parent, and Teacher screening forms. This test count on 9 clinical scales and 3 validity scales. Clinical scales are Inhibit, Self-Monitor, Shift, Emotional Control, Initiate, Working Memory, Plan/Organize, Task-Monitor, and Organization on materials. According to 3 validity scales, Inconsistency, Negativity, and Infrequency. BRIEF-2 gives three indexes, Behavior Regulation Index, Emotional Regulation Index, and Cognitive Regulation Index, and Global Executive Functions Index.

In this research, we used the Spanish version of BRIEF-2 [12]. This Spanish adaptation is from 5 to 18 years-old and counts on parents and teachers form. In the present study, we took data from both.

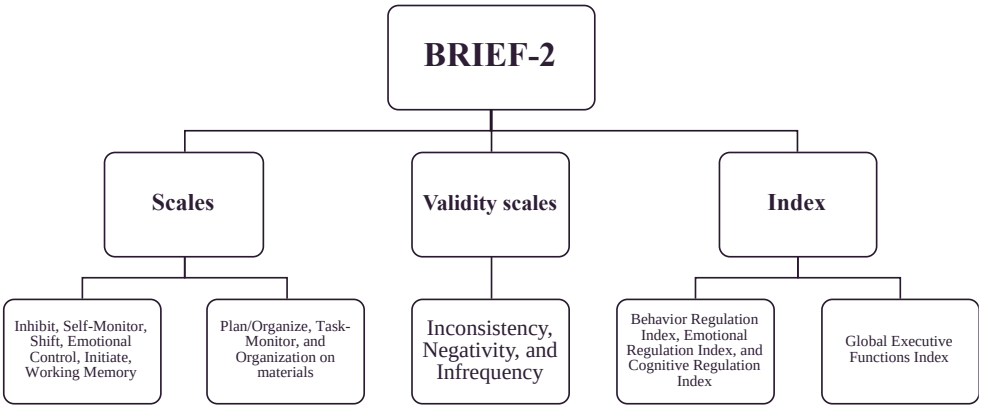

Figure 2. BRIEF-2 Test structure. Adapted from Maldonado et al., (2017).

- Torrance Creative Thinking Test (Torrance Test Creative Thinking, TTCT).

This test was created by Ellis Paul Torrance in 1966, 1974, 1976. The TTCT is a test of creativity, originally involved simple tests of divergent thinking and other problem-solving skills, which were scored on four scales [13]:

- Fluency. The total number of interpretable, meaningful, and relevant ideas generated in response to the stimulus.
- Flexibility. The number of different categories of relevant responses.
- Originality. The statistical rarity of the responses.
- Elaboration. The amount of detail in the responses.

This research used a Spanish adapted version of the Department of Education of the Government of the Canary Islands (Spain) of TTCT under the title Adapted and assessment of Torrance: Figure expression. Primary and secondary school [14]. This test allows an assessment of the Creative Thinking of children aged 6-16.

2.3. Data analysis.

First, a descriptive analysis of the participating boys and girls are carried out to their intellectual capacity and executive functioning, as well as their academic performance (reading and writing, as well as observations from the teachers). Next, using the mean results of the sample of participants in each of the subtests and indices, transformed to the corresponding scalar and composite scores, a mean profile of this sample of boys and girls

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is generated, which is characterized from the interpretations of their values and the analysis of the comparisons between tests.

Using the statistical package SPSS v.24, comparisons of the values obtained about the Spanish scales of the Scale are made, considering the mean values of the sample with the means of the special normative groups, and correlations between the tests used. Three studies are carried out for data treatment:

1. Independent approaches are made using as dependent variables: Total Intellectual capacity (IQ) of the WISC-V, compared to the 9 Executive Function factors (BRIEF- 2).

2. Analysis of Creativity as a dependent variable with the five indices of the WISC-V and the 4 previous indices of the BRIEF-2.

It is insisted that an analysis of the relations of BRIEF variables with those of the WISC is not intended, which would entail a more complex statistical and research study, but rather to observe the consistencies between scores of the scales that, from their theoretical construction – logic, suppose an adequate correlation and, consequently, bases for later work in a cognitive and neuropsychological line.

3. Results

3.1. Descriptive aspects.

The statistics of the sample are expressed in Table 2, from which a descriptive approximation is made at the beginning.

Table 2. Descriptive statistics of the sample.

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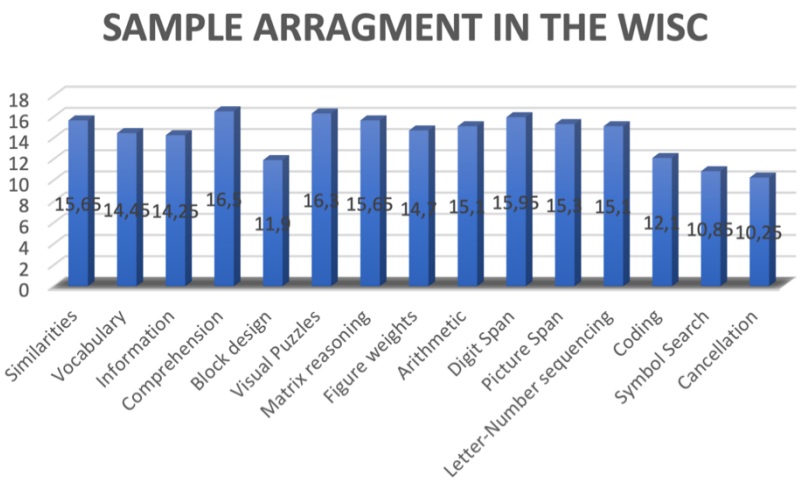
Statistical processing

		IQ	Global executive functions index	Creativity
N	Valid	20	20	20
	Lost	0	0	0
Mean		131,70	52,60	83,25
Standard mean error		1,473	3,088	3,480
Median		130,00	46,50	89,00
Mode		129	45	89[a]
Deviation		6,586	13,808	15,563
Variance		43,379	190,674	242,197
Asymmetry		,540	1,370	-1,418
Standard asymmetry error		,512	,512	,512
Kurtosis		,284	,853	1,250
Standard Kurtosis error		,992	,992	,992
Rank		27	47	55
Minimum		120	39	43
Maximum		147	86	98
Perecntile	10	124,00	40,10	53,90
	20	126,20	42,20	70,80
	25	127,50	43,50	74,25
	30	129,00	45,00	77,70
	40	129,00	45,40	87,80
	50	130,00	46,50	89,00
	60	133,00	48,60	92,00
	70	134,70	55,10	93,00
	75	135,00	60,50	93,00
	80	138,20	62,80	94,60
	90	141,70	78,00	97,00

The distribution of the sample in the Wechsler Scale is expressed in graph 2,



Graph 2. Distribution of the sample in the WISC.

It is a distribution that corresponds to that expressed in the WISC-V Manual and that can be specified more clearly in the following graph, with the data of its Indices (graph 3).

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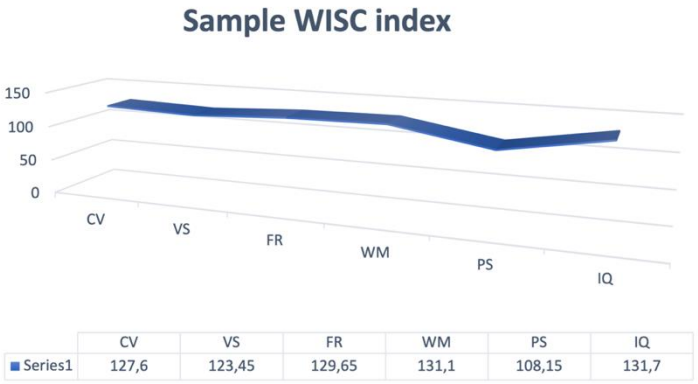

Graph 3. Index from WISC cases.

Our sample is placed in general (except in VSI) slightly above that in the Manual (special populations) (table 3).

Table 3. Comparison of sample data with the WISC-V scale.

	VC	VS	FR	WM	PS	IQ
Sample	127,6	123,4	129,6	131,1	108,1	131,7
WISC-V Scale	116,4	120,7	121,2	120,0	114,4	123,6

According to table 2 of statistics, the mean in the IQ, of 131.70, corresponds to 2 standard deviations above the average age (equivalent to a 98th percentile). The low standard deviation (6.58) is consistent with the premise of working with a specific and relatively homogeneous subpopulation (high-ability boys and girls). The minimum IQ of the sample of 120 falls within the cutoff point (slightly lower) usually used for the identification of high intellectual abilities (IQ equal to or greater than 120).

About the Torrance test, an average of 83.25 is obtained, with a minimum of 43 and a maximum of 98 for the general population (89th percentile if we take the median as reference), and it is also a homogeneous sample (an upward trend in creativity). It can be seen that 80% of the sample is at the 70th percentile or higher in the variable. In this regard, the criteria for the diagnosis in High Intellectual Abilities are framed in a value of creativity above a PC90, to establish giftedness.

In the BRIEF-2 Scale, Table 4 shows the mean and deviation of the different BRIEF-2 scales, together with the graph that follows (graph 4 a, b), a distribution of means:

Table 4. Mean and deviation of the different scales of the BRIEF-2.

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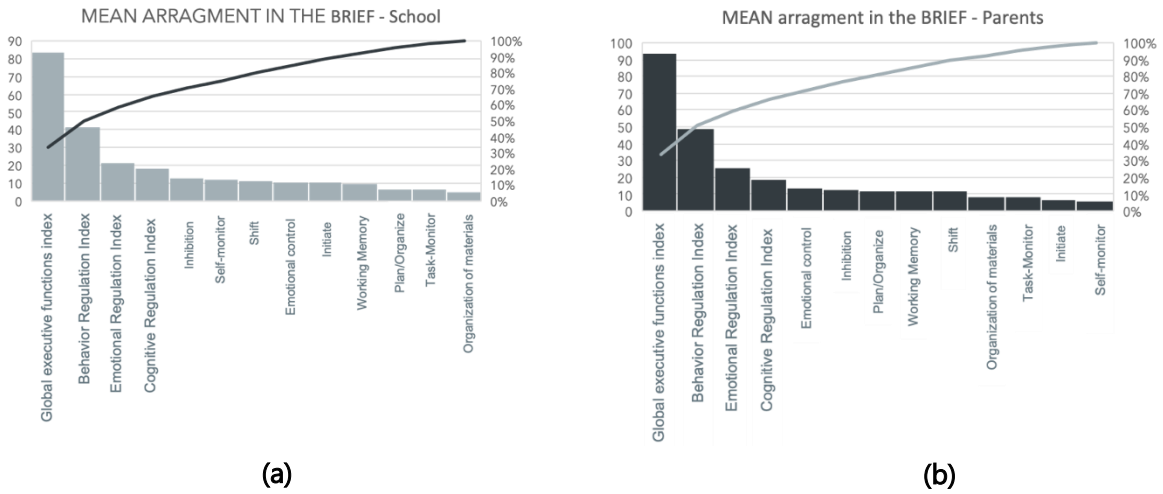
	Mean	Deviation
Inhibition	12,85	4,534
Self-monitor	6,95	2,781
Shift	11,05	3,927
Emotional control	11,30	4,985
Initiate	5,20	1,576
Working memory	11,05	4,298
Plan/organize	11,90	4,340
Task-Monitor	9,85	3,964
Organization of materials	6,90	2,845



Graph 4. (a) Distribution of the BRIEF – means School. **(b)** Distribution of the BRIEF – means Parents.

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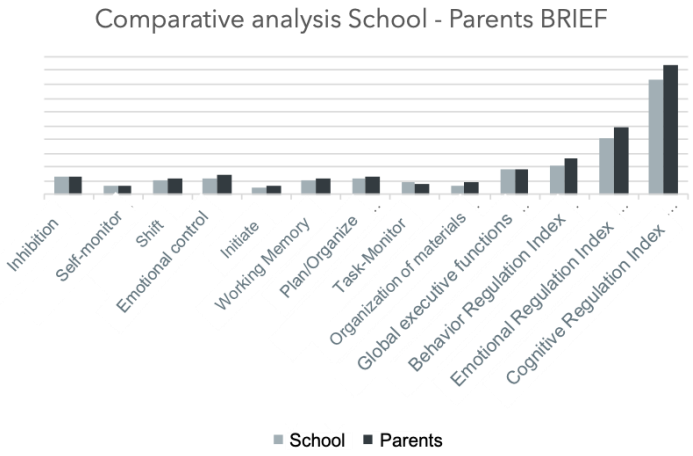
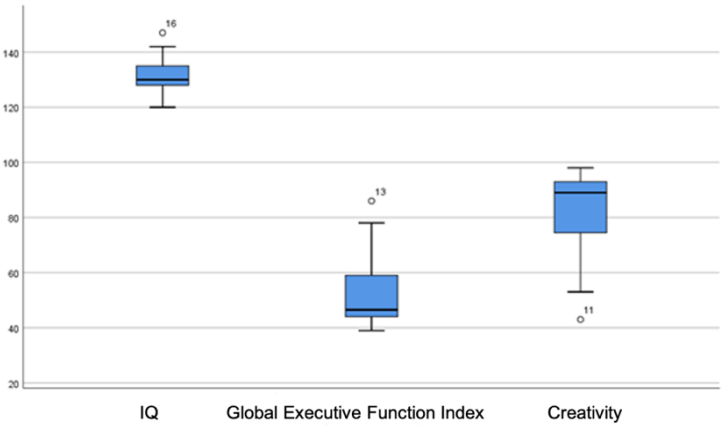
In graph (5) that continues, a comparison is made between the two applications of the test (School – Family). In it, a vision of coincidence between both instances can be appreciated, although the family perspective tends to increase somewhat, or what is the same, in equal graphic distribution, that of the family is very slightly oversized.



Graph 5. Comparative School - Family BRIEF.

The global Index of Executive Function is expressed in an average T score of 52.60, which could say that the sample is in an average percentile of 60 in this variable concerning the reference population. In the distribution, it can be seen that more than half of the subjects have T scores below 50, that is, below the mean in executive function. In any case, and for this variable, the sample is much more heterogeneous, finding students with executive function low, medium, and high.

In a first descriptive assessment, it could be summarized in a sample that is distributed with certain homogeneity, with rising means, for the variables of IQ and Creativity. On the other hand, the Executive Function is more heterogeneous with a downward mean (the three variables are jointly expressed in graph 6).



Graph 6. Representation of the distribution of the IQ, the global index of executive function and creativity.

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Altogether, as has already been expressed, high means are observed for Intelligence and Creativity, which would place us in the relationship studied between the intelligence and creativity constructs, in which their theoretical bases of thought, convergent and divergent, would explain a certain distance. between both skills. However, the data from this sample show high values, close to the PC 90 estimated in the criteria of the Ministry to distinguish giftedness and above 75 - 80, in which artistic talent would be located.

These results are consistent with the fact that creativity as a capacity or element of assessment is a constitutive part of the high capacities constructs. Our data generally show a high level of creativity, reiterating its intrinsic character. Perhaps the fact that the Torrance test has a higher cognitive load could serve as a link for this association with intelligence. In any case, it cannot be argued that this relationship deserves a more in-depth study, both in its theoretical basis and in aspects of measuring creativity (graphic, verbal, manipulative…). Certainly, the data would be in coherence with an assessment of the sample with the largest number of Complex Talent and Giftedness, compared to Simple Talent, to which the teachers' considerations about superior performance are added.

Regarding the variable of Executive Function, it is kept at a distance from high intellectual abilities, that is, in the sample there are students with low, medium, and high EF, suggesting that EF may appear in different degrees within the construct of high capabilities. This is consistent with the concept of executive functioning, which can be explained by the construct itself and by the existence of double diagnoses ("double exceptionality" in some studies) of Gifted students with ADHD, with Learning Difficulties, with Asperger's Syndrome in which the executive function is different for each of them. This aspect and the affective-emotional aspect allow us to explain the differences between boys and girls with high capacities in their personal, social and academic behavior. To this should be added the difficulty in breaking in the teachers the belief or stereotype of broad mastery in the execution of tasks, supposed for their Gifted diagnosis. In this sense, these teachers might prefer an explanation of an affective nature, focusing on the student a lower willingness to work due to lack of motivation or interest, rather than investigating a simple core of assessment of learning, its strategies, and its consequent revision of his teaching [15].

Regarding the academic performance of the students, their teachers state that these boys and girls are fast, of good execution in their activities, obviously with good grades and, in short, with objective indicators of a high level of application to academic tasks. In this regard, they express that their literacy learning is more advanced in its acquisition, with rapid development and expressive quality, compared to their age and academic levels. This is found in the application of the Reading and Writing Analysis Test (TALE, acronym in Spanish), showing how their reading speeds are at an average of 66.65 with a reading comprehension of 100 % for the four levels of the test. Consequently, this learning can be considered a variable of acquisition without difficulty, fluid, effortless, and of natural achievement to their will to learn. For these students, their learning to read is inherent (instrumental character for knowledge) to their desire to know.

3.1. Interpretative aspects.

The correlation of the CI and Creativity variable is positive (table 5), although of weak intensity (r = +0.2) and not statistically significant. It is an expected result since the sample is homogeneous in the two variables, all the students present a rising IQ and a high level of creativity.

Table 5. IQ and creativity correlations.

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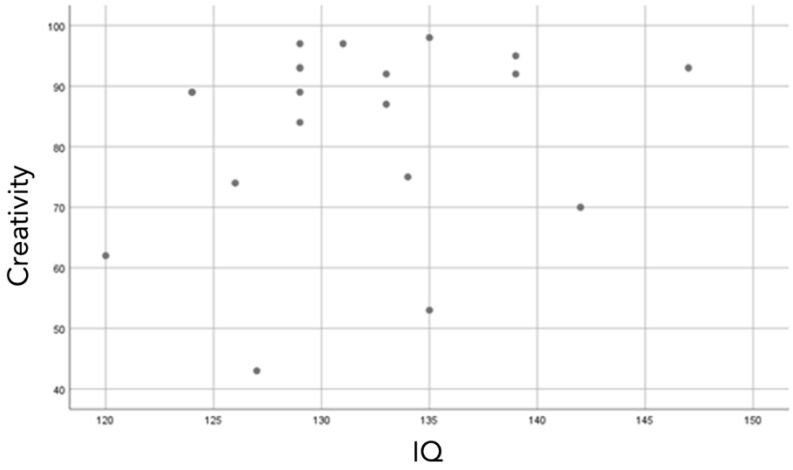
Correlations

		IQ	Creativity
IQ	Pearson Correlation	1	,202
	Sig. (bilateral)		,393
	N	20	20
Creativity	Pearson Correlation	,202	1
	Sig. (bilateral)	,393	
	N	20	20

Given the restricted range of both variables, the difficulty of joint covariation between them is observed.



Graph 7. Scatter diagram.

As can be seen in graph 7, there is creativity with a percentile equal to or greater than 70, both in subjects with IQ> 135 and in those with less. At the theoretical level, in the analysis of intelligence with creativity, a restricted point of view has prevailed, whereby behavior is qualified as wise, intelligent, or creative when it meets a set of cognitive abilities. Our results are obvious, showing that having already high IQ levels, creativity no longer has an impact. On the other hand, in subjects of average intelligence, creativity could be a good predictor of intelligence.

The correlation of IQ with the global index of executive function is positive, although of weak intensity (r = +0.185) and not statistically significant.

Table 6. IQ correlations and global index of executive function.

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Correlations

		IQ	Global executive functions index
IQ	Pearson Correlation	1	,185
	Sig. (bilateral)		,435
	N	20	20
Global executive functions index	Pearson Correlation	,185	1
	Sig. (bilateral)	,435	
	N	20	20

Certainly, the smaller sample size, as well as the academic development of our students focused on their performance (results or grades), could have an explanatory basis for this lower relationship. In other words, given some processes of logical, verbal, and mathematical reasoning, management, perceptual and memory and spatial aptitude, superior (by Gifted students), good academic performance can only be expected, but it is not noticed that in this performance other aspects that could be located within Executive Functions, and that would have a teaching response in the techniques and strategies of intellectual work.

In the calculation of the IQ correlation for each of the 9 primary dimensions of executive function, a positive correlation of moderate-intensity (r = +0.520) is observed between **IQ** and **Inhibition**, which could be related to behavioral mechanisms (Guided work, autonomy, impulse control, ...) of children that should be considered throughout the Stages of Early Childhood and Primary Education, to develop cognitive and metacognitive skills, as well as influence habits, techniques, and strategies of intellectual work in the classroom.

Table 7. Correlations between IQ and the 9 variables of executive functioning.

Correlations

		IQ	Inhibition	Self-monitor	Shift	Emotional control	Initiate	Working Memory	Plan/Organize	Task-Monitor	Organization of materials
IQ	Pearson Correlation	1	,520*	,269	,275	,365	-,161	-,094	-,029	-,018	-,030
	Sig. (bilateral)		,019	,251	,240	,113	,497	,693	,904	,940	,901
	N	20	20	20	20	20	20	20	20	20	20

It could be said that in the child subpopulation with high abilities, the only primary dimension of EF predicted by IQ is *"inhibition"* so that in conjunction with the other component *(self-supervision)*, the Regulation Index becomes important. behavior and its specific contribution to the IQ variable (see table 7).

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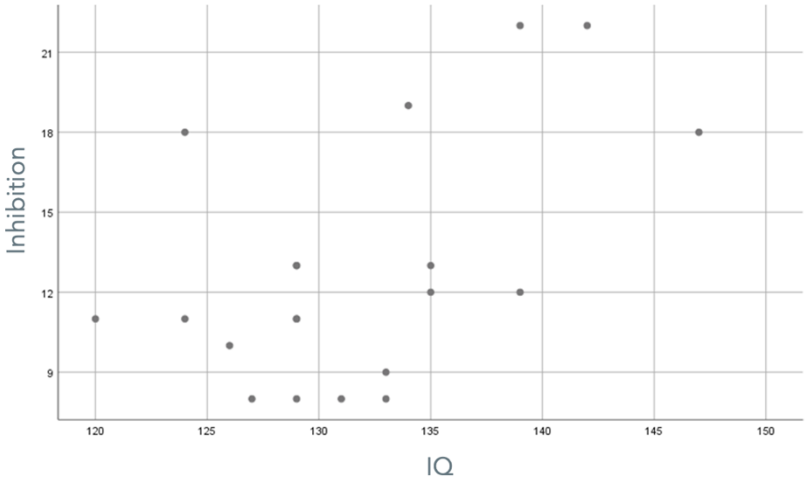

Graph 8. IQ scatter plot and inhibition.

Following the aforementioned, the calculation of the IQ correlation for each of the 3 secondary dimensions of executive function would result in that the only secondary dimension of EF predicted by IQ is the "behavioral regulation index" (r = +0.541; statistically significant), of which "inhibition" is an integral part (table 8).

Table 8. Correlation between IQ and the 3 indices of regulation of executive function

Correlations

		IQ	Behavior Regulation Index	Emotional Regulation Index	Cognitive Regulation Index
IQ	Pearson Correlation	1	,541*	,316	,057
	Sig. (bilateral)		,014	,174	,810
	N	20	20	20	20

Therefore, it could be affirmed that, in children with high capacities, good behavioral regulation (and more specifically inhibition) seems to have an exclusive role in contributing to an even higher IQ (the other dimensions of EF would not have an impact in that IQ increase in this subpopulation). It is striking that, in the BRIEF Manual, the Global Index of Cognitive Regulation correlates with the IQ of the WISC-V.

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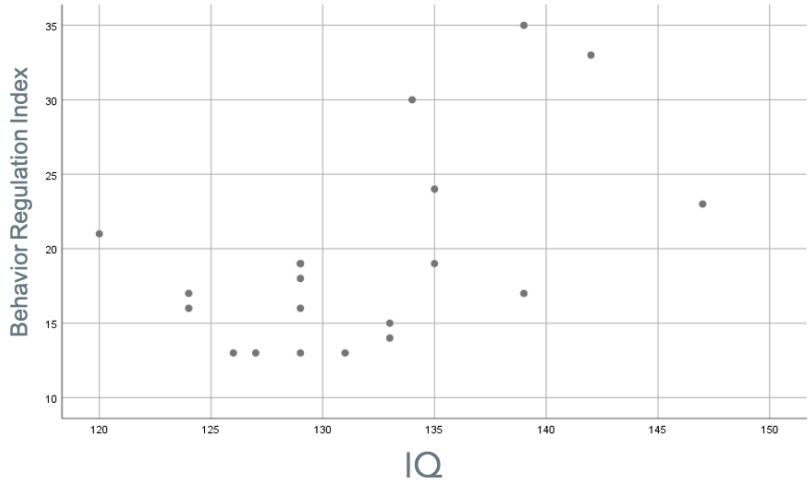

Graph 9. IQ and behavioral regulation index scatter plot.

A neuropsychological interpretation would place us in the least difficulty to regulate and supervise behaviors effectively in these children, with particular relevance in greater control of impulses and regulation of behavior. Regarding the other factor, self-supervision, a greater effect of the context could be pointed out, while the presence of problems depends on it and the possible explanations given in this regard. Consequently, this Index must also be intervened from the Tutorial Action in the classroom and through specific programs of intellectual work and effective learning.

For the Anglo-Saxon tradition that has continued with an approach towards giftedness, children and young people with very high intellectual capacity (above 140-150 IQ), have greater cognitive and metacognitive abilities in the regulation of behavior than those with a lower quotient. In some studies [16]; [15] it would be related to cognitive sensitivity that, at an intrapersonal level, would have to do with self-awareness, and at an interpersonal level, it would be about perspective-taking. In short, with a marked self-awareness and excellent understanding and appreciation of the other [15]. It will be convenient to continue in the study of the differences and similarities between the Gifted and Talented constructs, as the Spanish educational system has opted for the Gifted model, which brings together the former.

Regarding the association of these EF factors with the IVE to IRF Indices, they are understood, for this research, as subsumed in the IQ, as they do not provide relevant data in a small sample. In any case, this relationship would be of interest, insofar as it could reveal the obvious distance between fluid intelligence (VSI and less in FRI) and Executive Functions since in this it is possible to estimate the effect of learning or results of intellectual work strategies.

4. Discussion

In our classification of specific educational support needs (NEAE acronym in Spanish), Gifted Students would be located on the far right, with greater cognitive power than the normal curve, a situation that does not give them a homogeneous group character due to their needs and Similar educational responses, derived from the Gifted Students diagnosis.

In our study, on the other hand, homogeneity is observed due to being smaller and due to the characteristics of its members (boys and girls with excellent personal behavior and

academic performance). The mean of their IQ is framed in the correct score and deviation for the diagnosis of cognitive potentiality, within the criteria of the Ministry for its recognition. A correct correlation with the creativity factor is also observed, understood as a capacity that requires a powerful cognitive base. All in all, the EF factors result in a range of results, with less related to the two previous factors.

As is known, WM involves information processing of limited capacity, keeping the representation active, while using one information simultaneously with another, thus having fundamental importance in an executive capacity. But this concept of WM that we accept since its reformulation [17], integrated, and in operation by differentiated subcomponents (phonological loop, visuospatial agenda, central executive, and the episodic buffer), leads us to consider that it is not a question of a memory system, but rather an operating attention system, which works with memory contents. According to [18], WM should be conceptualized as a central system of cognitive control and executive processing, which guides behavior, involving interactions between the various functions and mental processes (attention, perception, motivation, emotion, and memory).

In this section, a certain level of correlation is observed between the aspects of Working Memory, Executive Functions, and IQ, in line with what is expressed in the BRIEF-2 Manual. In this Manual [12] (p. 72) a sample of 196 children (63% male and 37% female) with a mean age of 11.4 years is cited, with significant, although not high, correlations between Global EF and Cognitive Regulation. with IQ and Processing Speed, in addition to a significant association between the Working Memory scale and all the WISC index. On the other hand, in our work, there is a greater relationship with that of Behavioral Regulation and within this with the Inhibition factor.

The lower Processing Speed score for their profile is typical of Gifted students, just the opposite of what was observed in groups of people with intellectual disabilities [18]; [19]. This lower score might seem contradictory, but it would be related, on the one hand, with the lower value or interest that these students of good ability, give to the usual or routine activities. And on the other, associated with the attitude of doing it well, which considering that the tests that measure it are time-limited, would penalize them in the scores and Index. Interestingly, in school learning these activities are favored and are significantly valued in academic performance. In any case, the results in these boys and girls of a high Working Memory (attention, concentration, short and long-term memory, reasoning capacity, mental alertness, ...) with a lower Processing Speed (perception and visual selection, visual-motor coordination, cognitive flexibility, attention, and motivation; visual and sequential processing, learning and planning capacities ...), would reveal the existence of a dynamic interrelation between working memory, processing speed and reasoning [20]; [21]. In other words, a high working memory score for Gifted children would be an executive trade-off, compared to their reduced use of processing speed.

There is a distance between working memory and IQ in general. Thus, intellectual capacity represents power and with a base in the G factor, serving as a framework that would encompass executive functioning, furthermore, it uses higher mental functions (attention, memory, reasoning, ...). Consequently, the correlations, with due caution due to the smaller number in the sample, would express a mean association of both variables. Association that could be explained by the cognitive nexus, or underlying cognitive mechanisms, in some factors of the variables.

In this section, it could be said that the Executive Functions maintains its construct validity compared to the WISC, so that the three regulation indices, into which the Executive Functions of the test are subdivided, would express the operational and integration

factor between these processes cognitive and performance optimization [22]. The data from our sample, although less represented (small and homogeneous), could lead us to reflect on a greater weight of the cognitive in each of the cognitive, emotional, and behavioral regulation indices. In a certain way, this basis could mask the aspects of cognitive and emotional sensitivity, forcing a more specific assessment of the affective aspects and their behavioral projection. In this sense, gifted boys and girls may have an Executive Functions distribution that is not very different from the rest of their peers, although in our case the behavioral is relevant, but with an important cognitive basis.

In other words, if these boys and girls have a high cognitive sensitivity that makes them very aware of their actions, they are also prepared for behavioral and affective-emotional coping, so that they gain perspective. This will require a specific educational psychology intervention and an adequate tutorial action in the classroom.

5. Conclusions

In conclusion, the executive and memory aspects that underlie the concept of working memory could be the explanatory basis for the distance between IQ and EF of gifted boys and girls. On the one hand, in its association with affective-emotional development that is less considered in educational development, but which may be a basis of interest for motivation in academic performance. On the other, that understanding, processing, and execution would not be effective in themselves (considering themselves independent of their high intelligence), but perhaps due to a less strategic operation than intelligence implies.

Finally, the interrelationships on a characteristic profile of gifted boys and girls could be studied, in which their high levels of aptitudes or abilities and cognitive, psycholinguistic, attentional, or memory strategies, explain not only good academic results but also direct us towards an educational psychology intervention, with objectives of developing both cognitive and metacognitive strategies, as well as affective-emotional development that allows a balance in the educational response to their specific needs, traditionally focused on high curricular results and not on personal and social growth.

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