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Gifted Rating Scales (GRS2-P), في عينة إسبانية

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Abstract

The identification of students with high abilities must be a priority in any education system. In our country, the identification deficit is notorious, partly due to the absence of adequate instruments. The participation of teachers is a key element in this process. This work offers the first construct validation process of the Gifted Rating Scales (GRS 2-P) for Early Childhood Teachers for the identification of gifted in Spain. A confirmatory factor analysis (CFA) for ordinal variables and estimation (ULSMV) has been carried out on a sample of 134 teachers. Six models have been tested, of which the five-factor model corresponding to the original of the scale has been chosen, which has shown adequate adjustment values (χ2/gl, 1.44; CFI .92; TLI, .93; RMSEA, .057). For its part, the Average Variance Explained (AVE) has taken values between .45 - .74. Composite reliability shows values between .89 to .96. Although there are other empirically plausible models, we have opted for this solution adjusted to the original (M1), although further studies are suggested to confirm this point. The importance of having adequately validated instruments is considered essential in gifted identification processes that must incorporate various sources of information, such as that provided by teachers.

Keywords: Gifted Rating Scales, High Ability, Gifted Identification, Construct Validity, Confirmatory Factor Analysis

Resumen

La detección del alumnado con altas capacidades debe ser una prioridad en cualquier sistema educativo. En nuestro país el déficit de la identificación es notorio, en parte por la ausencia de instrumentos adecuados. La participación de los profesores es un elemento clave en este proceso. Este trabajo ofrece la primera validación de la Escala de Detección de alumnado con Altas Capacidades para Profesores de Educación Infantil, *Gifted Rating Scales* (GRS 2-P). Sobre una muestra de 134 profesores se ha llevado a cabo un análisis factorial confirmatorio (CFA) para variables ordinales y estimación (ULSMV). Se han probado seis modelos, de los cuales se ha optado por el de cinco factores que corresponde al original de la escala, que ha mostrado unos valores de ajuste adecuados (χ^2/gl, 1.44; CFI .92; TLI, .93; RMSEA, .057). Por su parte, la *Average Variance Explained* (AVE) ha tomado valores entre .45 - .74. La fiabilidad compuesta muestra valores entre .89 a .96. Aunque existen otros modelos plausibles, hemos optado por esta solución ajustada al original (M1), si bien se sugiere realizar nuevos estudios para confirmar este extremo. La importancia de disponer de instrumentos con una validación adecuada se considera esencial en los procesos de detección que deben incorporar fuentes diversas de información, como la que aportan los profesores.

Palabras clave: Escala de detección, altas capacidades, identificación, validez de constructo, análisis factorial confirmatorio

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Resumo

A deteção dos estudantes com elevadas capacidades deve ser uma prioridade em qualquer sistema educativo. No nosso país, o défice da identificação é notório, em parte devido à ausência de instrumentos adequados. A participação dos professores é um elemento-chave neste processo. Este trabalho oferece a primeira validação da Escala de Deteção de Estudantes com Elevadas Capacidades para Professores de Ensino Infantil, Gifted Rating Scales (GRS2-P). Foi realizada uma análise fatorial confirmatória (CFA) para variáveis ordinais e estimativa (ULSMV) a partir de uma amostra de 134 professores. Foram testados seis modelos, dos quais foi escolhido o modelo de cinco fatores correspondente ao original da escala, que mostrou valores de ajuste adequados (c2/gl, 1,44; CFI, .92; TLI, .93; RMSEA, .057). Por seu lado, a Average Variance Explained (AVE) obteve valores entre .45 - .74. A fiabilidade composta apresenta valores entre .89 a .96. Apesar de existirem outros modelos plausíveis, optámos por esta solução ajustada à original (M1), embora se sugira a realização de novos estudos para confirmar. A importância de dispor de instrumentos com uma validação adequada é considerada essencial nos processos de deteção que devem incorporar diversas fontes de informação, como a fornecida pelos professores.

Palavras-chave: Escala de deteção, capacidades elevadas, identificação, validade de constructo, análise fatorial confirmatória

摘要

在所有的教育系统中，资优学生的识别都应该占有重要的地位。然而我们国家在这方面的不足却非常明显，其中一方面的原因就是缺乏有效的工具，而另一方面，教师的参与也是保证该过程正常进行不可或缺的因素。因此该研究对帮助幼儿教师发现资优学生的资优评定量表（GRS2-P）进行首次验证。在 134 名教师样本上我们对定序数据和估计（ULSMV）进行验证性因子分析（CFA）。在对六个模型进行实验后，选择了拥有与原量表对应的五个因素的模型，原因在于这个模型拥有优秀的拟合优度（c2/gl 为 1.44、 CFI 为 0 .92、TLI 为 0.93、 RMSEA 为 0.057），而且其中模型的平均提取方差值在 0.45 到 0.74 之间，组合信度值介于 0.89 到 0.96 间。我们深知存在其他的优秀模型，最终我们决定选择这个与原模型（M1）拟合的解决方案，但是我们仍建议进行更多的研究来证实这一点。我们还认为在识别过程中应该引入更多样的信息源，比如教师方面可提供的信息等等，除此以外，不可忽略的重要环节便是使用经过有效验证的工具来进行识别。

关键词：识别量表、优质能力、辨识、建构效度、验证性因子分析

ملخص

إن اكتشاف الطلاب ذوي القدرات العالية يجب أن يكون أولوية في أي نظام تعليمي .إن العجز في تحديد الهوية أمر سيء السمعة في بلدنا، ويرجع ذلك جزئيًا إلى عدم وجود الأدوات المناسبة .تعد مشاركة المعلمين عنصرًا أساسيًا في هذه العملية .يقدم هذا العمل التحقق الأول من مقياس الكشف للطلاب ذوي القدرات العالية لمعلمي التعليم في مرحلة الطفولة المبكرة ,ومقاييس تقييم الموهوبين (GRS2-P). تم على عينة مكونة من 134 معلمًا .تم اختبار ستة (ULSMV) للمتغيرات الترتيبية والتقدير (CFA) إجراء التحليل العاملي التوكيدي نماذج ,تم اختيار النموذج الخماسي العامل منها ,والذي يتوافق مع أصل المقياس ,والذي أظهر قيم ملائمة مناسبة (c2/df, 1.44; CFI .92; TLI, .93; RMSEA، .057). من جانبه، أخذ متوسط التباين الموضح (AVE) قيمًا تتراوح بين .45 - .74. تُظهر الموثوقية المركبة قيمًا تتراوح بين .89 إلى .96 .وعلى الرغم من وجود نماذج أخرى معقولة ,فقد اخترنا هذا الحل المعدل إلى الحل الأصلي (M1), على الرغم من أنه يقترح إجراء دراسات جديدة لتأكيد ذلك .تعتبر أهمية وجود الأدوات ذات التحقق المناسب أمرًا ضروريًا في عمليات الكشف التي يجب أن تتضمن مصادر متنوعة للمعلومات، مثل تلك التي يقدمها المعلمون

الكلمات الدالة: مقياس الكشف ,القدرات العالية ,التحديد ,صدق البناء ,التحليل العاملي التوكيدي

Introduction

Detecting the potential of our students is clearly of vital importance, especially when we consider that the number of undetected gifted students in Spain is around 95% (Touron, 2023). We know that potential does not develop spontaneously but requires a series of catalysts and an appropriate context for it to develop into talent.

Early detection receives universal support in the context of special educational needs or neurodevelopmental disorders (Pfeiffer and Reddy, 1998, McLean, 2016) and the benefits of this approach on groups of gifted students or who have exceptional abilities at an early age are gaining wider recognition (Jackson, 2003; Morelock & Feldman, 1992; Pfeiffer, 2002; Pfeiffer & Petscher, 2008).

This has been widely accepted for many decades, as in the original studies by Leta Hollingworth (1942) and her work with outstanding students, where she affirmed that the sooner gifted children were identified, the more favorable their development would be. In her studies with profoundly gifted persons (IQ higher than 180), she said that in most cases their high ability and early development had manifested before the stage of Primary Education (Pressey, 1955). Authors like Bloom found that eminent adults had generally been noticed early in their lives, generally before they reached school age, and had been given excellent opportunities to develop their talent (Bloom 1982; 1985).

Identifying gifted students at an early stage is crucial because, as Pfeiffer and Petscher (2008) indicated, "It increases the probability of extraordinary achievements in the future and lowers the risk of social, behavioral, emotional, or educational problems at a later stage (Harrison, 2004; Hodge & Kemp, 2000; Morelock & Feldman, 1992; Pfeiffer and Stocking, 2000; Sankar-Deleeuw, 2002)" (p.19).

Even so, there is still widespread resistance to the acceptance of this fact, and to taking appropriate educational measures as a result. We find many difficulties in carrying out this objective, such as the question of budgets, the lack of programs to respond at early ages, and, above all, the lack of suitable instruments to carry out this first detection. There are also few early childhood education teachers (and not just in this stage) with the skills or adequate training to detect indicators of high potential in the classroom, and they do not have valid assessment instruments to carry out this task. Apart from psychological assessments for intellectual ability or performance, there is a need for other tools that can enable teachers and other responsible agents to detect and develop the potential of their students, observe early behaviors or potentially gifted ability, and thus complete the information in the student's profile.

The scales for detection available for teachers are few and hampered by technical deficiencies that limit their usefulness (Jarosewich et al., 2002). To address this scarcity, the Gifted Rating Scales (GRS) were created in 2003 after a period of thorough research. These scales for teachers are easy to use, reliable, and valid, having been used thousands of times and validated in many different countries. The original GRS included two forms for the teachers: GRS-P for Preschool Education students and GRS-S for students aged 6 to 13. These were revised and expanded later to include modifications (Shaughnessy, 2022) to result in GRS 2. The development of this new version of the scales was undertaken over a four-year period and is currently ready to be made available with a scale for use in the USA.

The central purpose of this work is to study the structure of this scale for the version for early childhood education teachers (*Gifted Rating Scales. Preschool/Kindergarten Form.* GRS 2-P) and provide experience with its psychometric properties, especially to study the reliability of each of its dimensions and how it fits with the scale development model. In other words, it aims to study its construct validity with particular attention to the use of the most suitable procedures for the ordinal measurement of the variables (items). This is the world's first validation of this new version, which has been extensively studied in the English language (Pfeiffer & Jarosewich, 2003), especially in relation with its previous version.

Method

The methodological approach used centers on context for validating the measuring instruments. It studied the validity of the structured dimensions that define the construct based on analysis of the relationships that arise between the items that are included, known as the construct validity. Confirmatory factor techniques were used to test different models for organizing the items in latent dimensions, as explained below.

Sample

The process of obtaining the sample, which is described in the procedural section, led to a total of 134 responses from teachers, referring to students with an average age of 4.7 (S.D. 0.91) that vary from 3 to 6 years old. 55.2% of these cases were in the third year of Preschool Education (74 cases), 30.6% in the second, and the other 14.2% were in first. Gaskin and Happell (2014) recommend that when there are 8 or more items per factor, and they obtain factorial weights around .5, a size of around 130 cases can be sufficient.

Most of the information was supplied by course tutors, a total of 98 responses (73.1%). Subject teachers or the equivalent, 15 (11.2%), guidance counselors provided 14 (10.4%), the support teachers 4 (3%), and finally there were 3 responses from gifted specialists.

As regards these sources' knowledge of the children, most of them (68.7%) state that they have known them for more than one year and only 9% (12 cases) say that they have been teaching them for a period of 3 months or less. The following table shows the complete distribution.

Table 1. Time they have known the student

	N	%
1 to 3 months	12	9.0
4 to 6 months	10	7.5
7 to 12 months	20	14.9
Over a year	92	68.7

The majority (97.8%) say that they know the children quite well or very well. There are only three cases where the respondents say that they do not know them very well. 21 cases also said that the cases had been identified with high ability, 15.7%. Seven cases (5.2%) said they were unaware of this issue.

Instrument

The GRS 2 scales (*Gifted Rating Scales - 2nd Edition)*, are a revised version of the original GRS scales created in 2003 (Pfeiffer & Jarosewich, 2003) that contain the same key elements as their predecessor with the addition of variants and new features, such as an unpublished form for the parents, which we have also assessed for the first time in Spain (Tourón, et al., 2023a).

These are the detection scales designed to assess the characteristics of students who may have high ability. There are two teacher forms that range from 4 to 18 years of age and allow them to provide information on the students in various categories.

The instrument studied here is the Preschool/Kindergarten Form (GRS 2-P) which was developed for children aged 4 to 6 and designed to be easy for Preschool teachers to use. It contains 50 items arranged in 5 categories. Each item is scored with a 9-point Likert scale divided into 3 ranges: 1 to 3 for below average; 4 to 6 for the average; and 7 to 9 for above average. This format allows the teacher to determine, first of all, if the student is below average, average, or above average in the specific behavior when compared with other students of the same age. The teacher can then decide, within this range, if the student is in the lower, middle, or upper part of the class.

The following is a brief description of the five categories included in GRS 2-P:

Intellectual Ability: It assesses abstract reasoning (Sternberg, 1985), problem solving (Sternberg, 2000a), thinking, mental agility (Gagné, 1993), and memory (Dai, 2018; Pfeiffer, 2015; Silverman, 2018; Sternberg & Kaufman, 2018).

Academic Ability: referring to the student's ability to deal with fact-based or school-related materials. High levels of ability in reading, mathematics, and other aspects of the school curriculum are indicators of academic ability, along with the ease of learning new knowledge and skills (Gagné, 1993) and the ability to understand complicated materials. Academically gifted students often manage large amounts of information (Schneider, 2000; Sternberg, 2000a), including a wide knowledge of the world around them (Olszewski-Kubilius et al., 2019; Pfeiffer, 2015).

Creativity: refers to the student's ability to think, act, or make unique and original thoughts and products that are new and innovative (Abdulla and Cramond, 2017; Cropley, 2000; Csikszentmihalyi and Wolfe, 2000; Runco, 2014). Creativity can be expressed in various ways: solving problems, experimenting with new ideas, developing a solution to a group problem, or by using imagination. Creative students are inventive (Cropley & Urban, 2000), curious (Beghetto & Plucker, 2016), and inquisitive (Presbury et al., 1997). They show a preference for challenges and complexity (Olszewski-Kubilius, 2000) and will engage in problem solving in a perceptive and creative way (Plucker et al., 2018; Simonton, 2000; Sternberg, 2000b; Runco, 2014).

Artistic Talent: the students' potential or demonstrated ability for theater, music, dance, drawing or painting, sculpture, singing, playing musical instruments, or acting are assessed. They can express themselves in different ways: how they do their activities, finish their work, or use art materials or artistic media. Students gifted with artistic talent learn quickly and show more mature and technically sophisticated abilities than students who are not (Hargreaves et al., 1996; Kozbelt, 2019; Subotnik et al., 2019; Winner and Martino, 2000). Artistically gifted students express more individuality in their work or performance (Haroutounian, 1995, 2003; Porath, 1993).

Motivation: refers to the students' drive or persistence, their desire to succeed, tendency to relish challenging work, and ability to work hard without external stimulation or support (Dweck, 1999, 2006; Ryan & Deci, 2000). Motivation is not considered a type of talent, but rather the energy that pushes a student on to achieve a goal or give up. The scores in this category reflect a student's level of "grit" (Duckworth, 2016; Duckworth & Seligman, 2005). It can be noted when working on academic tasks, art projects, or when leading a group activity (Clinkenbeard, 2012); Olszweski-Kubilius et al., 2015). It is not an indicator of high ability but a measure of the student's drive, persistence, and desire to do well. Motivation pushes the student to achieve or reach an outstanding level (Pink, 2009).

The scale is designed in response to a theoretical model with these five latent factors, each composed of 10 items, distributed as shown in table 2:

Table 2. Categories and items from the teachers' scale

Intellectual	Academic	Creativity	Artistic	Motivation
I2	I1	I6	I3	I8
I4	I7	I12	I17	I9
I5	I10	I21	I19	I11
I13	I18	I23	I28	I16
I14	I22	I36	I33	I20
I15	I25	I37	I34	I24
I27	I30	I40	I38	I26
I29	I31	I44	I41	I35
I32	I39	I47	I42	I48
I45	I43	I49	I46	I50

Procedure

The scales, originally in English, were translated independently by the first and third authors, experts in the field of gifted education. These translations were compared with each other without discrepancies arising. This translation was later checked by the technical staff of the publisher who currently holds the rights to them (MHS Assessment). The authors' proposal was accepted without changes.

Once the scale was created in Spanish, it was hosted by an online service (Survey Monkey) to make it available to those who had to respond. The items in the scale were arranged at random to avoid possible bias due to the original order of the scales when the items were grouped by category (Bishop, 2011; Tourón et al., 2018).

Besides prior instructions about how to complete the scale and its purpose, the form also included other descriptive variables such as who completed the scale (tutor/course tutor/counselor/ support teachers/ gifted expert/other), and about the person being assessed: sex, age, course, how long they have known them, performance, psycho-pedagogical assessment, and any tests that provide information about the student.

The scale was available between April and December 2022. Participants were invited to take part through associations for parents of gifted children (58); schools and institutes received letters explaining what the study was about, the scale, and the nature of their collaboration. Participation was also encouraged through social media. In all cases, participation was voluntary and anonymous.

This procedure was naturally not intended to achieve a statistically representative random sample from the whole collective of Preschool Education teachers. For the purpose of the study, which is to provide initial evidence of the validity and structure of the scale, it was enough for the sample to be sufficiently broad and varied.

Data analysis

Confirmatory Factor Analysis (CFA) was used to obtain proof of the construct validity, applying the original model consisting of five factors or categories: Intellectual, Academic, Creative, Artistic and Motivation, as the initial reference (M1 and M2). A unidimensional model (M3) was also tested, and another with 4 dimensions that merged intellectual and academic abilities (M4) and some variations of second order factors (M5 and M6). The following table includes a description of the six factorial models that were estimated.

Table 3. Estimated confirmatory models

Model	Structure	Specification
M1	5 Factors	Original Model. Estimation (ULSMV)
M2	5 Factors	Original Model. Estimation (MLMV)
M3	1 Factor	Unidimensional Model
M4	4 Factors	Merger of Intellectual and Academic factors
M5	5 Factors	+ 2nd order factor (Intellectual-Academic)
M6	4 Factors	+ 2nd order factor (Cognitive-Creative)

The Likert scales with more than 5 points can show distributions with metric characteristics (Viladrich et al., 2017); however, before starting the confirmatory study, an analysis was carried out of a possible lack of normality in the single and multiple variety. The first used Shapiro-Wilk statistics while the second used Mardia's symmetry and kurtosis statistics. Significant values pointed to a lack of normality in both cases. There were also descriptive statistics of the items, including central tendency information (mean and median), dispersion (standard deviation), and discrimination (item-total correlation).

Factorial analysis strategy always relies on the initial consideration of the average level of the items. In the case of this type of item, with an ordinal metric, the recommended approach is to use polychoric correlations (Lloret-Segura et al., 2014 and Gaskin & Happell, 2014). In contrast, if a quantitative distribution of data can be accepted, although its form reveals a certain asymmetry, the Pearson correlation matrix can be used as the basis for the factorial study.

On the other hand, the method for estimating the parameters of the factorial model must also fit the metric of the items. In the case of ordinal distributions, the option of robust unweighted least square (ULSMV) produces the best results with samples that are not very large (Xia, 2016). This model entails the definition of a larger number of parameters because the response to the items is defined in a non-linear form, through probit regression equations. If we can accept quantitative distributions, the most suitable estimators would offer maximum plausibility and, in the specific case of Likert scales with a high number of categories, the robust versions have been shown to work well (Li, 2016), such as the version that fits for mean and variance (MLVMV). All models assume the existence of correlation between the different factors.

In accordance with the above, the first two models (M1 and M2) were estimated using the same factorial structure but with a different matrix of correlations and estimators. M1 uses a model for ordinal items (polychoric correlations and ULSMV estimators) and M2 considers them as quantitative but with asymmetric distributions (Pearson correlations and MLMV estimators). The other models tested use the strategy that offers the best results in the first comparison.

Standardized indexes were used in the model evaluation phase: Robust normalized chi-squared (χ^2/gl.), to evaluate the overall fit, where values between 3 and 5 are considered acceptable; RMSEA, to evaluate the residual matrix, which is acceptable with values below .08; CFI (*Comparative Fit Index*); and TLI (*Tucker-Lewis Index*), for comparative fit, which is acceptable from a result of .90. According to Hu and Bentler (1999), an acceptable fit in the combination of these indexes is sufficient evidence of validity. The modification indexes were also calculated in this case.

The dimensionality of the construct is reinforced by interpretation of the relationship between latent factors and by studying the convergent validity of the factors, which indicates the internal consistency of the items that they are composed of. The Average Variance Extracted (AVE) was used and complemented by the composite reliability indexes.

The AVE was calculated by adding the squared standardized factorial loads (Pi) (equivalent to R^2) and dividing it be the total number of items in the category, as indicated in the formula (1).

$$AVE = \frac{\sum_{i=1}^{N} P_i^2}{n} \quad (1)$$

The Composite Reliability (CR) was estimated from the factorial loads and the error variance (ei) with the formula (2), as follows:

$$FC = \frac{\left(\sum_{i=1}^{n} P_i\right)^2}{\left(\sum_{i=1}^{n} P_i\right)^2; \left(\sum_{i=1}^{n} e_i\right)} \quad (2)$$

Where an item's error variance is the result of subtracting its squared factorial load from 1, as indicated in the formula (3).

$$e_i = 1 - P_i^2 \quad (3)$$

AVE values of .5 or more indicate that the factor can explain 50% or more of the variability in responses to the items that comprise it. Combining this statistic with composite reliabilities higher than .7 can confirm the convergent validity of the factors.

Finally, the size of the standardized factorial weights for each item were analyzed. Values between 6 and 8 are good, with the additional aim of achieving this 50% variability explained in the responses to each item. To complement this, the modification indexes associated with possible changes in the parameter that identify the relationship between item and factor were observed.

The estimations of the parameters of the different confirmatory factorial models were performed using MPlus8.1 software (Muthen and Muthen, 2012-2017).

Results

First of all, the descriptive statistics for the items are shown in Table 4. We can see that the average is quite high, in most cases above 7 or even 8 points. The only item with an average below 6 points is I9 ("*Resists becoming discouraged in the face of obstacles or problems*"). I5 (*"Learns new information quickly"*) and I27 (*"Demonstrates a good memory by remembering facts and details"*) achieve the highest scores, with averages of 9 points and very close distributions with deviations generally less than 1. Besides, the overall average for the scale is 7.2 points (S.D.=1) and the average median is at 7.4 points.

Noting the correlation between each item and the total, the tendency is positive. All items are measured in the same direction and the values vary between .4 and .8, with a median of 61, a result that indicates that the group of items is homogeneous. The normality statistic of each item shows that assumption is not met in all the cases.

Table 2. Descriptive statistics of the items

Items	N	Mean	Median	SD	Min.	Max.	Shapiro-Wilk	p	Polyserial
I1	134	7.94	8.0	1.28	2	9	.781	< .001	.59
I2	134	7.74	8.0	1.40	3	9	.802	< .001	.58
I3	134	6.82	7.0	1.73	2	9	.911	< .001	.61
I4	134	8.13	8.0	1.01	4	9	.777	< .001	.55
I5	134	8.36	9.0	.96	4	9	.667	< .001	.57
I6	134	7.60	8.0	1.17	4	9	.890	< .001	.59
I7	134	7.73	8.0	1.29	2	9	.845	< .001	.39
I8	134	6.58	7.0	2.20	1	9	.890	< .001	.68
I9	134	5.81	6.0	2.17	1	9	.941	< .001	.58
I10	134	7.70	8.0	1.16	4	9	.836	< .001	.63
I11	134	7.40	8.0	1.84	1	9	.801	< .001	.68
I12	134	7.70	8.0	1.18	3	9	.844	< .001	.60
I13	134	7.94	8.0	1.25	2	9	.779	< .001	.67
I14	134	7.83	8.0	1.12	4	9	.838	< .001	.49
I15	134	7.80	8.0	1.22	4	9	.832	< .001	.65
I16	134	6.87	7.0	2.12	1	9	.869	< .001	.74
I17	134	6.72	7.0	1.87	1	9	.918	< .001	.69
I18	134	7.64	8.0	1.33	4	9	.860	< .001	.52
I19	134	6.51	7.0	1.97	1	9	.920	< .001	.70
I20	134	6.81	7.0	1.92	1	9	.888	< .001	.72
I21	134	7.22	7.0	1.31	3	9	.904	< .001	.59
I22	134	7.95	8.0	1.17	4	9	.817	< .001	.48
I23	134	7.73	8.0	1.41	1	9	.813	< .001	.54
I24	134	6.64	7.0	2.02	1	9	.898	< .001	.72
I25	134	8.11	8.0	1.14	3	9	.740	< .001	.54
I26	134	6.27	7.0	2.11	1	9	.924	< .001	.70
I27	134	8.44	9.0	.93	4	9	.637	< .001	.47
I28	134	6.32	6.0	1.96	1	9	.931	< .001	.76
I29	134	7.97	8.0	1.11	3	9	.813	< .001	.53
I30	134	7.40	8.0	1.61	1	9	.862	< .001	.37
I31	134	7.72	8.0	1.49	2	9	.803	< .001	.54
I32	134	7.40	7.5	1.26	3	9	.903	< .001	.66
I33	134	6.31	6.0	1.98	1	9	.933	< .001	.74
I34	134	6.38	7.0	2.03	1	9	.923	< .001	.73
I35	134	7.19	7.5	1.73	1	9	.868	< .001	.71
I36	134	7.02	7.0	1.57	1	9	.905	< .001	.71
I37	134	7.57	8.0	1.30	3	9	.873	< .001	.60
I38	134	6.10	6.0	1.91	1	9	.938	< .001	.67
I39	134	7.42	8.0	1.67	1	9	.844	< .001	.64
I40	134	7.07	7.0	1.58	1	9	.905	< .001	.62
I41	134	6.08	6.0	1.94	1	9	.944	< .001	.69
I42	134	6.10	6.0	1.86	1	9	.944	< .001	.72
I43	134	7.21	7.0	1.66	2	9	.882	< .001	.59
I44	134	7.28	7.0	1.24	3	9	.914	< .001	.63
I45	134	8.17	8.0	1.04	4	9	.761	< .001	.60
I46	134	7.33	7.5	1.54	1	9	.872	< .001	.55
I47	134	7.37	8.0	1.37	3	9	.900	< .001	.56
I48	134	6.01	6.0	2.22	1	9	.937	< .001	.70
I49	134	7.50	8.0	1.34	3	9	.877	< .001	.69
I50	134	7.31	8.0	1.72	1	9	.827	< .001	.65

The results of the multivariate normality test, shown in Table 5, with symmetry values and multivariate kurtosis also reveal non-compliance with the assumption, which will make it necessary to consider this aspect in the model estimates, as we have noted in the data analysis section.

Table 3. Multivariate normality statistics

	Value	Statistical*	gl	p
Symmetry	1924	28905	22100	< .001
Kurtosis	2802	16.2		< .001

*Symmetry statistics assume χ^2 distribution and kurtosis assumes standardized normal distribution

Table 6 includes the fitness results of the six confirmatory models studied. Remember that the first two (M1 and M2) estimate the five-factor model by using different analytical strategies, the first fitting with the ordinal format of the items, and the second considering them in quantitative terms, but with asymmetric distribution. M3 assumes a single latent feature. M4 refers to the four-factor model that combines the items of the intellectual and academic categories. Finally, M5 and M6 include second order factors in the model. M5 tests the presence of a common factor to explain the results for intellectual and academic ability, that is, it is a variation of M1 but with the second order factor. Finally, M6 repeats M4, with four factors, but adding a second order factor that combines the cognitive and creative categories.

Table 4. Fitness indexes of the CFA

	M1	M2	M3	M4	M5	M6
χ^2	1680	1494	2378.00	1687.96	1677.65	1749.99
gl	1165	1165	1175	1169	1167	1170
p	< .001	< .001	< .001	< .001	< .001	< .001
χ^2**/gl**	1,442	1,283	2,024	1,444	1,438	1,496
RMSEA	0,057	0,046	0,100	0,058	0,057	0,061
RMSEA (LI)	0,051	0,039	0,095	0,051	0,051	0,055
RMSEA (LS)	0,063	0,053	0,105	0,064	0,063	0,067
CFI	0.92	0.78	0.76	0.92	0.92	0.91
TLI	0.93	0.82	0.71	0.92	0.90	0.92

M1 and M2 use the original five-factor or category model (Intellectual, Academic, Creativity, Artistic, and Motivation) but vary the method for estimating the parameters, as indicated. The first considers an ordinal arrangement of the items (polychoric correlations and ULSMV estimation), while the second treats them as quantitative but with distributions distant from normality (Pearson correlations and MLNMV estimation).

In M1, the compared fitness indexes (CFI and TLI) achieve acceptable values (>.92), the index based on residuals (RMSEA) is at the limit of optimal values (<.06) and the global fitness value, considering χ^2 normalized, also shows a good fit (< 3). If we look at M2, global fit and the residuals improve substantially, but the comparative fit does not achieve acceptable values. For this reason, the other models were estimated using the estimation model for M1, as we said in the preceding paragraph.

If we look at Table 7, the correlation values between categories obtained in M1, the categories of academic and intellectual abilities, are closely correlated (.998), which can suggest the same meaning for these two categories. This model was tested on M4 and the fit values are similar to M1.

M3, which tests the possible one-dimensionality of the construct, does not reach, as was expected, acceptable values in the comparative fit indexes (CFI and TF <.9), nor the residuals of the observed and estimated correlation matrices (RMSEA > .08).

The four-factor structure defined in M4 achieves a similar result to M1. A factor that explains the set of responses to the intellectual and academic ability items can therefore also be confirmed. M5 also hints at this common factor.

In five-factor models (M1 and M5), the academic ability category, as seen in Table 8, is the only one that does not achieve an AVE of .5 or higher. In other words, it explains at least 50% of the variability in the responses to the items that form part of it. The indicator of internal consistency (composite reliability) is very close to .9. The other categories are all higher than this .9. The estimation in M5 also produces a factorial weight of more than 1 in the second order factor. This occurs in connection with the intellectual factor and academic category, leading to a negative error variance. This could be caused by the sample size, which is enough to estimate 4 or 5 categories with the features of these models (more than 8 items per category and factorial weights higher than .6), but there are problems with estimates of the effects of this more complex model.

In these models (M1 and M5), item 30 (of the academic scale) has an R^2 below .3 (see Table 9), a value that is slightly better in the model that combines the intellectual and academic factors (M4). The AVE of this factor and composite reliability are good. Moving this item to the intellectual scale, or deleting it, are options that could improve the fit.

Finally, the fit in M6 is slightly worse than M1 and M4. The hypothesis of a possible second order factor that can explain the responses of the cognitive factor (intellectual-academic) and creativity can be raised, because the fit values continue to be acceptable. If we consider these values, however, the most appropriate is to specify separate categories for the cognitive and creative aspects.

Table 5. Correlations between categories

	Intellectual	Academic	Creative	Artistic	Motivation
Intellectual	1				
Academic	.998	1			
Creative	.734	.813	1		
Artistic	.409	.467	.598	1	
Motivation	.622	.688	.557	.657	1

As regards the convergent value, table 8 includes the values of the average variance extracted (AVE) for the set of items for each factor; it also includes information about composite reliability to study the internal consistency of each group of items.

The results show good values, except for the particular cases mentioned above about the academic factor in models M1 and M5. The artistic scale has the best explanation of the responses to the different items that are part of it, with AVE values higher than .7, which means more than 70% of extracted variability in all models. The motivation factor explains more than 60% of variability in the responses, and intellectual ability has the same AVE in M1. This value, however, falls by 10% when merged with academic abilities in M4. The creativity factor can explain roughly 60% of variability in the responses to the items that form part of it.

One notable result are the good composite reliability values that support the multi-category structure of the model, with scores higher than .9. The large number of items in each factor helps to achieve this result.

Table 6. Evidence of convergent validity

	Average Variance Explained (AVE)					
Factors	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**
Intellectual	.64	.58		.54	.64	.54
Academic	.45	.41			.45	
Creative	.59	.55		.59	.59	.59
Artistic	.74	.72		.74	.74	.74
Motivation	.64	.58		.64	.64	.64
Total	.61	.57	.43	.63	.61	.63
	Composite Reliability					
Intellectual	.95	.93		.96	.95	.96
Academic	.89	.87			.89	
Creative	.94	.88		.94	.94	.94
Artistic	.96	.96		.96	.96	.96
Motivation	.95	.94		.95	.95	.95
Total			.97			

Table 9 (cont.). Factorial weights (b), R^2 and residuals of the items estimated in M1

Factor	Item	b	R^2	Error
Intellectual	I2	.80	.63	.37
	I4	.76	.57	.43
	I5	.84	.70	.30
	I13	.85	.72	.28
	I14	.68	.46	.54
	I15	.82	.67	.33
	I27	.75	.56	.44
	I29	.79	.62	.38
	I32	.87	.75	.25
	I45	.84	.71	.29
Academic	I1	.76	.58	.42
	I7	.56	.31	.69
	I10	.76	.58	.42
	I18	.63	.40	.60
	I22	.63	.39	.61
	I25	.74	.55	.45
	I30	.53	.28	.72
	I31	.69	.48	.52
	I39	.67	.44	.56
	I43	.67	.45	.55
Creativity	I6	.73	.53	.47
	I12	.76	.57	.43
	I21	.76	.57	.43
	I23	.73	.53	.47
	I36	.83	.68	.32
	I37	.74	.54	.46
	I40	.77	.59	.41
	I44	.83	.68	.32
	I47	.77	.59	.41
	I49	.81	.65	.35
Factor	**Item**	**b**	**R^2**	**Error**
Artistic	I3	.74	.55	.45
	I17	.82	.68	.32
	I19	.87	.76	.24
	I28	.95	.89	.11
	I33	.93	.86	.14
	I34	.91	.83	.17
	I38	.83	.69	.31
	I41	.87	.76	.24
	I42	.90	.80	.20
	I46	.72	.52	.48
Motivation	I8	.78	.61	.39
	I9	.64	.40	.60
	I11	.85	.72	.28
	I16	.87	.75	.25
	I20	.82	.67	.33
	I24	.81	.65	.35
	I26	.79	.62	.38
	I35	.84	.71	.29
	I48	.79	.63	.37
	I50	.80	.64	.36

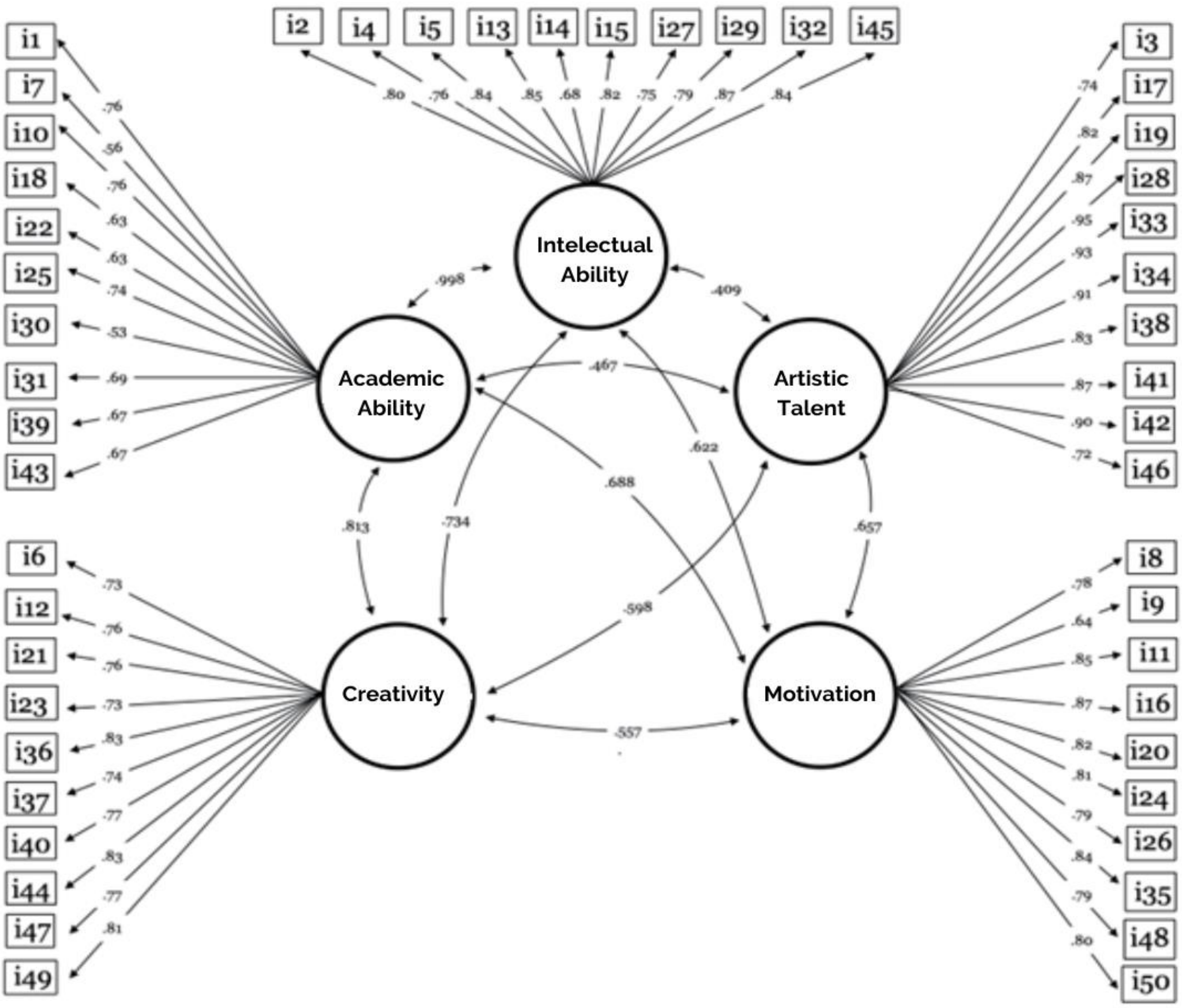
Finally, table 9 includes the factorial weights, the extracted variability of each item in terms of R^2 and standard error. The high values of the coefficients stand out in all categories, except for the values below .6 for the factorial weight of item 30 ("*Comprehends written material*") in the academic factor. The estimate of the effect of the factor on item 7 (*"Demonstrates extensive Knowledge about one or more topics"*) is below this value (.557), results that back up the suitability of the sample used.

Discussion

We tested six models that express variants of the original five-factor structure of the scale and the one-dimensional model, to contrast against the fit of the others. Ordinal and quantitative measures were compared and as expected, there is a better result for the ordinal option and ULSMV estimate (M1) compared with the quantitative estimate (M2). The other models tested therefore used this estimate.

The results obtained show acceptable goodness of fit of the five-factor model that the scale was designed with (see Fig. 1), but there are other variants that are also plausible and could be defended from an empirical perspective, in accordance with the fitness index, the AVE results, and reliability.

Figure 1. Representation of the M1 model adopted



Model 1 shows a particularly strong correlation between intellectual and academic abilities, which might lead us to think that they are measuring the same latent factor, so that they could be merged into just one factor or dimension. This is the case of model 4, which joins the intellectual and academic factors, reducing the model to four factors, and model 5, which raises a second order factor that joins these two first order categories. For its part, model 6 also uses a second order factor to combine them, including the creative abilities, but this option has the worst results in terms of fitness values.

The option preferred, at least provisionally, is to choose model 1, based on its goodness of fit (CFI, .92; TLI, .93 and RMSEA, .057), reliability (.89-.96), and variance extracted by factors (.45-.74). Even so, there are some inconclusive aspects, such as the option of model 4 or even model 5, which could be justified empirically. Bearing in mind that the original model is a suitable fit, it is our proposed solution in this study, leaving distinct alternative models to those examined here for later studies.

The data we have advises us to prefer a cautious approach. Nevertheless, the results might indicate that teachers at this stage of education do not establish a clear difference between what the scale sets as intellectual and academic abilities. In fact, the correlation between these factors is nearly perfect (.998). This aspect must be verified in other, further studies. Some studies of the GRS (Benson and Kranzler, 2018) questioned the dimensionality of the scale, proposing instead a single factor, which is not compatible with our results (M3). The development of the instrument has also been recognized as conceptually and educationally solvent by various authors (Margulies and Floyd, 2004).

There has been, so far, no validation data for this scale (GRS 2) in other countries, as there was for its predecessor, GRS. There are three translation and validation studies in China, Turkey, and Greece for the previous version of the Preschool/Kindergarten Form scale, which is tested here. These studies show good values in terms of the reliability and validity of the original structure with five factors (Siu, 2010; Karadag, et al., 2016; Sofologi, et al., 2022).

The decision about this structure has practical consequences for the use of the scale, as we can use scores for each category or a global score, a question that can be tackled in new studies However, from the diagnostic point of view, specific indicators (categories) are always to be preferred to global scores that could obscure significant differences.

Each validation process for an instrument naturally requires more than one study to draw conclusions, but the results obtained in this first analysis support the original structure proposed by the authors of the scale. We think that item 30 ("*Comprehends written materia*l") might be reconsidered and placed in a different category that is part of Academic Ability scale to see whether it is a better fit or might benefit from rephrasing.

What is essential is to continue with the process of validation as well as grading of this scale for the Spanish population so that Preschool teachers can have a useful, reliable, and valid tool to help them in these vital first years to detect and develop the potential of their students, and that it may be combined with the validated versions for parents and teachers (Tourón, et al, 2023a & 2023b).

To sum up, this work fulfills its core purpose by providing substantive evidence in relation to the factorial structure and psychometric properties of the scale studied. It opens the way for future studies to offer new evidence to consolidate the results obtained herein.

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References

Abdulla, A. M., & Cramond, B. (2017). After Six Decades of Systematic Study of Creativity: What do Teachers Need to Know About What it is and How it is Measured? *Roeper Review*, *39*(1), 9-23. https://doi.org/10.1080/02783193.2016.1247398

Beghetto, R. A., & Plucker, J. A. (2016). Revisiting the Relationship Among Schooling, Learning, and Creativity. In J. C. Kaufman & J. Baer (Eds.), *Creativity and Reason in Cognitive Development* (pp. 72–91). Cambridge University Press. https://doi.org/10.1017/CBO9781139941969.005

Benson, N. F., & Kranzler, J. H. (2018). Another Look at the Construct Validity of the Gifted Rating Scales: Preschool/kindergarten and School Forms. *Journal of Psychoeducational Assessment*, *36*(8), 782-797. https://doi.org/10.1177/0734282917710377

Bishop, G. F. (2011). Item Order Randomization. In P. J. Lavrakas. *Encyclopedia of Survey Research Methods*, (pp. 397-399). SAGE. https://doi.org/10.4135/9781412963947.n255

Bloom, B. (1985). *Developing Talent in Young People*. Ballantine Books.

Bloom, B. S. (1982). The Role of Gifts and Markers in the Development of Talent. *Exceptional Children*, *48*(6), 510-522. https://doi.org/10.1177/001440298204800607

Clinkenbeard, P. R. (2012). Motivation and gifted students: Implications of theory and research. *Psychology in the Schools*, *49*(7), 622-630. https://doi.org/10.1002/pits.21628

Cropley, A. J. (2000). Defining and Measuring Creativity: Are Creativity Tests Worth Using? Roeper Review, 23(2), 72-79. https://doi.org/10.1080/02783190009554069

Cropley, A. J., & Urban, K. K. (2000). Programs and Strategies for Nurturing Creativity. In K. A. Heller, F. J. Mönks, R. Subotnik, Robert Sternberg (Eds.), International Handbook of Giftedness and Talent (2nd ed., pp. 485-498). Pergamon Press. https://doi.org/10.1016/B978-008043796-5/50034-6

Csikszentmihalyi, M., & Wolfe, R. (2000). New Conceptions and Research Approaches to Creativity: Implications of a Systems Perspective for Creativity in Education. In K. A. Heller, F. J. Mönks, R. Subotnik, Robert Sternberg (Eds.), International Handbook of Giftedness and Talent (2nd ed., pp. 81-93). Pergamon Press. https://doi.org/10.1016/B978-008043796-5/50006-1

Dai, D. Y. (2018). A History of Giftedness: Paradigms and Paradoxes. In S. I. Pfeiffer (Ed.), *Handbook of Giftedness in Children* (2nd. ed., pp. 1-14). Springer. https://doi.org/10.1007/978-3-319-77004-8_1

Duckworth, A. (2016). *Grit: The Power of Passion and Perseverance*. Scribner/Simon & Schuster.

Duckworth, A. L., & Seligman, M. E. (2005). Self-discipline outdoes IQ in predicting academic performance of adolescents. *Psychological science*, *16*(12), 939-944. https://doi.org/10.1111/j.1467-9280.2005.01641.x

Dweck, C. S. (1999). *Self-Theories: Their Role in Motivation, Personality, and Development*. Psychology Pres.

Dweck, C. S. (2006). *Mindset: The New Psychology of Success*. Random House.

Gagné, F. (1993). Constructs and Models Pertaining to Exceptional Human Abilities. In K. A. Heller, F. J. Mönks, & A. H. Passow (Eds.), International Handbook of Research and Development of Giftedness and Talent (pp. 69–87). Pergamon Press.

Gaskin, C. J., & Happell, B. (2014). On Exploratory Factor Analysis: A Review of Recent Evidence and Assessment of Current Practice, and Recommendations for Future Use. *International Journal of Nursing Studies*, *51*(3), 511-521. https://doi.org/10.1016/j.ijnurstu.2013.10.005

Hargreaves, D. J., Galton, M. J., & Robinson, S. (1996). Teachers' Assessments of Primary Children's Classroom Work in the Creative Arts. *Educational Research*, *38*(2), 199–211. https://doi.org/10.1080/0013188960380207

Haroutounian, J. (1995). Talent Identification and Development in the Arts: An Artistic/Educational Dialogue. *Roeper Review*, *18* (2), 112–117. https://doi.org/10.1080/02783199509553710

Haroutounian, J. (2003). Musical Talent: Nurturing Potential and Guiding Development. In P. Olszewski-Kubilius, L. Limburg-Weber & S. I. Pfeiffer (Eds.), *Early Gifts: Recognizing and Nurturing Children's Talents*, (pp. 83-102). Prufrock Press.

Harrison, C. (2004). Giftedness in Early Childhood: The Search for Complexity and Connection. *Roeper Review*, *26*(2), 78-84. https://doi.org/10.1080/02783190409554246

Hodge, K. A., & Kemp, C. R. (2000). Exploring the Nature of Giftedness in Preschool Children. *Journal for the Education of the Gifted*, *24*(1), 46-73. https://doi.org/10.1177/016235320002400103

Hollingworth, L. S. (1942). *Children Above 180 IQ, Stanford-Binet; Origin and Development*. The World Dood Company. https://doi.org/10.1037/13574-000

Hu, L. T., & Bentler, P. M. (1999). Cutoff Criteria for Fit Indexes in Covariance Structure Analysis: Conventional Criteria *versus* New Alternatives. *Structural Equation Modeling*, *6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Jackson, N. E. (2003). Young Gifted Children. In N. Colangelo & G. A. Davis (Eds.), *Handbook of Gifted Education* (3rd Ed., pp. 470-482). Allyn & Bacon.

Jarosewich, T., Pfeiffer, S. I., & Morris, J. (2002). Identifying Gifted Students Using Teacher Rating Scales: A Review of Existing Instruments. *Journal of Psychoeducational Assessment*, *20*(4), 322-336. https://doi.org/10.1177/073428290202000401

Karadag, F., Karabey, B., & Pfeiffer, S. (2016). Identifying Gifted Preschoolers in Turkey: The Reliability and Validity of the Turkish-Translated Version of the GRS-Preschool/Kindergarten Form. *Journal of Education and Training Studies*, *4*(10), 8-16. https://doi.org/10.11114/jets.v4i10.1686

Kozbelt, A. (2019). Reflections on Talent Development in the Performing Arts: Concluding Comments. In R. F. Subotnik, P. Olszewski-Kubilius, & F. C. Worrell (Eds.), *The psychology of High Performance: Developing Human Potential into Domain-Specific Talent* (pp. 301–307). American Psychological Association. https://doi.org/10.1037/0000120-014

Li, C. H. (2016). Confirmatory Factor Analysis with Ordinal Data: Comparing Robust Maximum Likelihood and Diagonally Weighted Least Squares. *Behavior Research Methods*, *48*, 936-949. https://doi.org/10.3758/s13428-015-0619-7

Lloret-Segura, S., Ferreres-Traver, A., Hernández-Baeza, A., & Tomás-Marco, I. (2014). [Exploratory Item Factor Analysis: a practical guide revised and updated]. *Annals of Psychology*, *30*(3), 1151-1169.

https://doi.org/10.6018/analesps.30.3.199361

Margulies, A. S., & Floyd, R. G. (2004). Book review: Gifted Rating Scales (GRS). *Journal of Psychoeducational Assessment*, *22*(3), 275-282. https://doi.org/10.1177/073428290402200306

McLean, M., Sandall, S.R., Smith, B.J. (2016). A History of Early Childhood Special Education. In B. Reichow, B. Boyd, E. Barton, S. Odom, (Eds.), *Handbook of Early Childhood Special Education*. Springer, Cham.

Morelock, M. J., & Feldman, D. H. (1992). The Assessment of Giftedness in Preschool Children. In E. V. Nuttall, I. Romero, & J. Kalesnik, (Eds.), *Assessing and Screening Preschoolers: Psychological and Educational Dimensions* (pp. 301-309). Allyn & Bacon.

Muthén, L. K., & Muthén, B. O. (2012-2017). Mplus User's Guide. Eighth Edition. Muthén & Muthén.

Olszewski-Kubilius, P. M. (2000). The Transition from Childhood Giftedness to Adult Creative Productiveness: Psychological Characteristics and Social Supports. *Roeper Review*, *23*, 65–71. https://doi.org/10.1080/02783190009554068

Olszewski-Kubilius, P., Subotnik, R. F., & Worrell, F. C. (2015). Antecedent and Concurrent Psychosocial Skills that Support High Levels of Achievement Within Talent Domains. *High Ability Studies*, *26*(2), 195-210. https://doi.org/10.1080/13598139.2015.1095077

Olszewski-Kubilius, P., Worrell, F. C., Subotnik, R. F., & Foley-Nicpon, M. (2019). Reflections on Talent Development in Academics. In R. F. Subotnik, P. Olszewski-Kubilius, & F. C. Worrell (Eds.), *The Psychology of High Performance: Developing Human Potential into Domain-Specific Talent* (pp. 225–236). American Psychological Association. https://doi.org/10.1037/0000120-011

Pfeiffer, S. I. (2002). Identifying Gifted and Talented Students: Recurring Issues and Promising Solutions. *Journal of Applied School Psychology*, *1*, 31-50. https://doi.org/10.1300/J008v19n01_03

Pfeiffer, S. I. (2015). *Essentials of Gifted Assessment*. John Wiley & Sons.

Pfeiffer, S. I., & Jarosewich, T. (2003). GRS: Gifted Rating Scales. Psychological Corporation.

Pfeiffer, S. I., & Petscher, Y. (2008). Identifying Young Gifted Children Using the Gifted Rating Scales-Preschool/Kindergarten Form. *Gifted Child Quarterly*, *52*(1), 19-29. https://doi.org/10.1177/0016986207311055

Pfeiffer, S. I., & Reddy, L. A. (1998). School-Based Mental Health Programs: Present Status and Blueprint for the Future. *School Psychology Review*, *27*, 84-96. https://doi.org/10.1080/02796015.1998.12085900

Pfeiffer, S. I., & Stocking, V. B. (2000). Vulnerabilities of Academically Gifted Students. *Special Services in the Schools*, *16*(1-2), 83-93. https://doi.org/10.1300/J008v16n01_06

Pink, D. H. (2009). *Drive: The surprising truth about what motives us*. Riverhead Books.

Plucker, J.A., Guo, J., Makel, M.C. (2018). Creativity. In S. I. Pfeiffer (Ed.). *Handbook of Giftedness in Children* (81-99). Springer. https://doi.org/10.1007/978-3-319-77004-8_6

Porath, M. (1993). Gifted young artists: Developmental and individual differences. *Roeper Review*, *16*(1), 29–33. https://doi.org/10.1080/02783199309553530

Presbury, J. H., Benson, A. J. & Torrance, E. P. (1997). Creativity. In G. G. Bear, K.

M. Minke, & A. Thomas (Eds.), *Children's needs II: Development, Problems and Alternatives* (pp. 449-456). National Association of School Psychologists.

Pressey, S. L. (1955). Concerning the Nature and Nurture of Genius. *The Scientific Monthly*, *81*(3), 123-129.

Runco, M. A. (2014). "Big C, Little c" Creativity as a False Dichotomy: Reality is not Categorical. *Creativity Research Journal*, *26*(1), 131-132. https://doi.org/10.1080/10400419.2014.873676

Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology*, *25*(1), 54–67. https://doi.org/10.1006/ceps.1999.1020

Sankar-DeLeeuw, N. (2002). Gifted Preschoolers: Parent and Teacher Views on Identification, Early Admission, and Programming. *Roeper Review*, *24*, 172-177. https://doi.org/10.1080/02783190209554174

Schneider, W. (2000). Giftedness, Expertise, and (exceptional) Performance: A Developmental Perspective. In K. A. Heller, F. J. Mönks, R. J. Sternberg, & R. F. Subotnik (Eds.), *International Handbook of Giftedness and Talent, (*2nd. Ed., pp. 165-177). Elsevier. https://doi.org/10.1016/B978-008043796-5/50012-7

Shaughnessy, M. F. (2022). An Interview with Steven I. Pfeiffer: Gifted Rating Scales-(GRS [TM] 2). North American Journal of Psychology, 24(1), 1-1.

Silverman, L. K. (2018). Assessment of Giftedness. In S.I. Pfeiffer (Ed.), *Handbook of Giftedness in Children* (2nd.Ed., pp. 183-207). Springer. https://doi.org/10.1007/978-3-319-77004-8_12

Simonton, D. K. (2000). Creativity: Cognitive, Personal, Developmental, and Social Aspects. *American Psychologist*, *55*(1), 151–158. https://doi.org/10.1037/0003-066X.55.1.151

Siu, A. F. (2010). The Reliability and Validity of a Chinese-Translated Version of the Gifted Rating Scale-Preschool/Kindergarten Form. *Journal of Psychoeducational Assessment*, *28*(3), 249-258. https://doi.org/10.1177/0734282909345832

Sofologi, M., Papantoniou, G., Avgita, T., Lyraki, A., Thomaidou, C., Zaragas, H., Ntritsos, G., Varsamis, P., Staikopoulos, K., Kougioumtsis, G., Papantoniou, A. & Moraitou, D. (2022). The Gifted Rating Scales-Preschool/Kindergarten Form (GRS-P): A Preliminary Examination of Their Psychometric Properties in Two Greek Samples. *Diagnostics*, *12*(11), 2809. https://doi.org/10.3390/diagnostics12112809

Sternberg, R. J. (1985). Implicit Theories of Intelligence, Creativity, and Wisdom. *Journal of Personality and Social Psychology*, *49*(3), 607. https://doi.org/10.1037/0022-3514.49.3.607

Sternberg, R. J. (2000a). Giftedness as Developing Expertise. In K. A. Heller, F. J. Mönks, R. J. Sternberg, & R. F. Subotnik (Eds.), *International Handbook of Giftedness and Talent, (*2nd. Ed., pp. 55-66). Elsevier. https://doi.org/10.1016/B978-008043796-5/50004-8

Sternberg, R. J. (2000b). Identifying and Developing Creative Giftedness. *Roeper Review*, *23*(2), 60-64. https://doi.org/10.1080/02783190009554067

Sternberg, R. J., & Kaufman, S. B. (2018). Theories and Conceptions of Giftedness. In S.I. Pfeiffer (Ed.), *Handbook of Giftedness in Children* (2nd. Ed., pp. 29-47). Springer. https://doi.org/10.1007/978-3-319-

77004-8_3

Subotnik, R. F., Olszewski-Kubilius, P., & Worrell, F. C. (Eds.). (2019). *The Psychology of High Performance: Developing Human Potential Into Domain-Specific Talent.* American Psychological Association. https://doi.org/10.1037/0000120-000

Tourón, J. (2023). ¿Puede una escuela inclusiva ignorar a sus estudiantes con altas capacidades? *Entera2.0.*, *10*, 24-46. https://ciberespiral.org/es/entera2-0-numero-10/

Tourón, J., Martín, D., Navarro Asensio, E., Pradas, S. e Íñigo, V. (2018). Validación de constructo de un instrumento para medir la competencia digital docente de los profesores (CDD) [Construct validation of a questionnaire to measure teachers' digital competence (TDC)]. *Revista Española de Pedagogía, 76*(269), 2554. https://doi.org/10.22550/REP76-1-2018-02

Tourón, M., Navarro-Asencio, E. & Tourón, J. (2023a). Validez de Constructo de la Escala de Detección de Alumnos con Altas Capacidades para Padres (GRS2), en España. *Revista de Educación*. *1* (402), 53–80. https://doi.org/10.4438/1988-592X-RE-2023-402-595

Tourón, M.; Tourón, J.; Navarro-Asencio, E. (2023b). Validación española de la Escala de Detección de altas capacidades, Gifted Rating Scales 2 (GRS 2-S) School Form, para profesores. [Spanish Validation of the Gifted Rating Scales (GRS 2-S) School Form]. *Estudios sobre Educación*, *46*. pre-print.

Viladrich, C., Angulo-Brunet, A., & Doval, E. (2017). A Journey Around Alpha and Omega to Estimate Internal Consistency Reliability. *Annals of Psychology*, *33*(3), 755-782. https://doi.org/10.6018/analesps.33.3.268401

Winner, E. & Martino, G. (2000). Giftedness in Non- Academic Domains: The Case of the Visual Arts and Music. In K.A. Heller, F.J. Monks, R.J. Sternberg, & R.F. Subotnik (Eds.), *International Handbook of Giftedness and Talent,* (2nd. Ed., pp. 95–110). Elsevier. https://doi.org/10.1016/B978-008043796-5/50007-3

Xia, Y. (2016). Investigating the Chi-square Based Model-fit Indexes for WLSMV and ULSMV Estimators (Dissertation). Florida State University. http://purl.flvc.org/fsu/fd/FSU_2016SU_Xia_fsu_0071E_13379

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