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Identification by teachers of intellectual gifted students: construction of an instrument and evidence of content validity

Identificação por professores de alunos com dotação intelectual: construção de instrumento e evidências de validade de conteúdo

Identificación por parte del profesorado de alumnos con dotación intelectual: construcción de un instrumento y evidencia de validez de contenido

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Abstract

The present study reports the construction process of a screening-type scale for evidence indicating academic giftedness (Scale for Nominating Intellectual Giftedness: teacher version [ENDI-p]), as well as presenting evidence of content validity. The construction of the items was based on the ten broad domains of the theoretical model of intelligence known as Cattell-Horn-Carroll (CHC): fluid intelligence, quantitative knowledge, short-term memory, long-term memory storage and retrieval, visual processing, auditory processing, processing and execution speed, reaction, and decision speed, reading and writing; initially containing 80 items. Such items were evaluated by five reviewers. The results showed that 21 items (26.2 %) were excluded once they did not reach an agreement value equal to or greater than 80 %. The kappa coefficient between judges was adequate. Version 2 of the scale is ready to be used in future studies which aim at investigating its psychometric qualities.
Keywords: intelligence; giftedness; academic giftedness; talent

Resumo

O presente estudo relata o processo de construção de uma escala do tipo rastreio para sinais indicativos de dotação acadêmica (Escala para Nomeação de Dotação Intelectual: versão professor [ENDI-p]), bem como apresentar evidências de validade de conteúdo. A construção dos itens foi baseada nos dez domínios amplos do modelo teórico sobre inteligência conhecido como Cattell-Horn-Carroll (CHC): inteligência fluida, raciocínio matemático quantitativo, memória de curto prazo, armazenamento e recuperação em longo prazo, processamento visual, processamento auditivo, rapidez de processamento e execução, velocidade de reação e decisão, leitura e escrita; contendo, inicialmente, 80 itens. Tais itens foram avaliados por cinco juízes. Os resultados demonstraram que 21 itens (26,2 %) foram excluídos por não alcançarem valor de concordância igual ou maior do que 80 %. O coeficiente kappa entre os juízes foi adequado. A versão 2 da escala está pronta para ser utilizada em estudos futuros voltados à investigação das suas qualidades psicométricas.
Palavras-chave: inteligência; superdotação; superdotação acadêmica; talento

Resumen

El presente estudio reporta el proceso de construcción de una escala tipo cribado para signos indicativos de dotación académica (Escala para Nomeação de Dotação Intelectual: versão professor [ENDI-p]), además de presentar evidencia de validez de contenido. La construcción de los ítems se basó en los diez amplios dominios del modelo teórico sobre inteligencia, conocido como Cattell-Horn-Carroll (CHC): inteligencia fluida, razonamiento matemático cuantitativo, memoria a corto plazo, almacenamiento y recuperación a largo plazo, procesamiento visual, procesamiento auditivo, velocidad de procesamiento y ejecución, velocidad de reacción y decisión, lectura y escritura; inicialmente con 80 ítems. Estos elementos fueron evaluados por cinco jueces. Los resultados mostraron que se excluyeron 21 ítems (26.2 %) por no alcanzar un valor de concordancia igual o superior al 80 %. El coeficiente kappa entre jueces fue adecuado. La versión 2 de la escala está lista para ser utilizada en futuros estudios destinados a investigar sus cualidades psicométricas.

Palabras clave: inteligencia; superdotación; superdotación académica; talento

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The interest in understanding the superior abilities displayed by talented and gifted people has increased in recent decades. In Brazil, the country where the present study was developed, the definition that underpins public policies states that talented and gifted people, a term adopted in the country, are those who have high skills in one or more areas of human development, such as intellectual, academic, psychomotor, leadership, creativity, as well as representative involvement with tasks of interest and motivation for learning (Brasil, 2012).

This multidimensional conception of the phenomenon has guided public policies in several countries (Li et al., 2009; Nakano & Oliveira, 2020). Currently, many programs are driven to this target public to go beyond identification through intelligence, including other types of abilities that may prove to be high, so that the objective of identifying talent/giftedness is aimed at understanding the individual and one's special needs (Sternberg, 2023).

Unlike what many still think, the identification of talent and giftedness does not target labeling nor the creation of a privileged group (Pocinho, 2009; Sabatella, 2008). Its main objective is to provide information about such population, especially the identification of their strengths and specific needs, so that the given knowledge can be used to provide opportunities for adaptation, appreciation of their strengths and positive qualities, as well as the strengthening of personal resources (Scorsolini-Comin & Santos, 2010), building a positive self-concept, motivation, and emotional stability (Chagas-Ferreira, 2014). In this fashion, assessments and possible interventions can favor a healthier social, emotional, academic, and psychological development (Irueste et al., 2018).

In addition to these aspects, knowledge of potentials can act as a protective factor in relation to possible maladjustments, mainly social and emotional ones, which may be due to lack of identification, and such aspects are usually identified as a source of vulnerabilities and emotional difficulties in this population (Piske, 2016; Prado & Fleith, 2016).

However, despite the benefits, in practice, difficulties related to identification have proven to be one of the main challenges of the theme (Al-Hroub & El Khoury, 2018). Among the main reasons, the absence of properly validated instruments for this group of students can be mentioned. Consequently, the loss of talent resulting from difficulties in identifying talented/gifted students not only deprives society of the potential contributions these people could make, as it also limits these students' opportunities, impairing their ability to achieve their personal and professional goals (Nakano & Peixoto, 2023).

Considering that the valuation of potentials varies according to the context (Sternberg, 2023), the development or adaptation of measures for the assessment of talent/giftedness must be carried out for the population in which they will be used. In this sense, the lack of valid measures to identify such individuals has acted to prevent their identification (Barbosa et al., 2012). Such gap highlights the need for instruments to be developed specifically for use in this population, to contemplate the heterogeneity of profiles and the different levels of skills presented by people with this condition (Zaia & Nakano, 2020). According to the authors, this concern is relevant if we consider that, commonly, these people can easily reach the maximum score level that other tests can measure, due to their widespread ness for the regular population, so that different levels of performance, located at the top of the skills, will not be correctly measured and differentiated.

Additionally, it is important to identify the areas in which this high potential is manifested, especially when observing the variety of ways in which talent/giftedness manifests itself: intellectual, academic, or school, productive-creative, social, psychomotor, among others (Chagas, 2007; Mettrau & Reis, 2007). Depending on the area in which talent/giftedness is manifested, different behaviors and skills can be evident.

This study focuses on the intellectual type of talent/giftedness, which is related to the presence of a high ability in relation to general intellectual capacity, marked by the presence of cognitive characteristics such as flexibility and fluency of thought, abstract thinking ability to make associations and solve problems, ideational production, speed of thought, superior understanding and memory, verbal ability and well-developed reasoning (Farias, 2012; Nakano, 2021). It also includes the manifestation of high potential in domains related to intellectual achievements (Stricker et al., 2019). The process of constructing a scale to assess this type of giftedness is reported in this study.

High cognitive abilities are present in Renzulli's Three Rings model (Renzulli, 2016; Renzulli & Reis, 2018), which guides Brazilian public policies, as one of the three pillars that characterize giftedness. The importance of intelligence as a characteristic can be verified through the large number of theories and instruments aimed at this construct (Wechsler et al., 2022). Among such models, the Cattell-Horn-Carroll model stood out, being recognized as the most comprehensive (Schneider & McGrew, 2018).

The assessment of superior potential in the field of intelligence is based on the observation that this is a stable construct and an important predictor of life outcomes such as years of schooling, positive behaviors related to health, school performance, professional success, and socioeconomic status, not limited to those cited here (Caemmerer et al., 2020). According to Heyder et al. (2018), knowledge about intellectual talents is the most easily recognized, including by teachers. In this sense, in the process of indication for evaluation, such professionals assume an essential role, acting as an external evaluation of the behaviors associated with talent/giftedness (Pfeiffer & Blei, 2008). Point out that, in Brazil, most students who attend special programs are admitted through referrals made by their professors (Alencar et.al., 2018; Farias, 2012; Farias & Wechsler, 2018).

Although it is understood that this type of talent/giftedness has been valued since the first studies on the subject, when this phenomenon was understood as an exclusive synonym of high intelligence, this misconception is still present in common sense (Tan et al., 2019). Identified through tests that evaluated this construct and, consequently, estimated the intelligence quotient (Sternberg & Kaufman, 2018), this practice ended up excluding many potentials that are not adequately evaluated by this type of instrument, or even by the limitations of the areas in which they evaluate. Another difficulty is supported by the fact that psychological tests are tools exclusively used by psychologists during a psychological assessment process. The high time required to complete this process, as well as its cost (Nakano, 2021) acts to reduce the number of identifications carried out, resulting in an underreporting of cases.

Consultation of teachers may be a possible solution since it has the advantage of reduced cost and shortening the screening time. This professional can assess the presence of behaviors that are "typically" presented by talented/gifted students (Hertzog et al., 2018), to be consulted within a process of systematic observation of students (Cleveland, 2017). The teacher evaluation scales have thus been used as a first filter for students, offering them a more comprehensive evaluation (Nakano et al., 2016).

The importance of teacher evaluation (such as screening) is reiterated. Without, therefore, ignoring its limitations. If the evaluating teacher does not receive training in this regard, his/her participation in this screening can be biased and subjective. However, based on study reviews, the credibility of these professionals' participation in the process of identifying gifted students has been highlighted (Gagne, 1989; Guenther, 2006). However, despite these limitations, teachers' referrals have played an important role in screening and targeting other resources for this public in the international context.

Given the importance of a first identification made by the teacher, different instruments can be found in Brazil: Screening Of High Ability / Giftedness Indicators: Teacher Version (Nakano, 2021), The Precocity Identification Scale and Talent/Giftedness Indicators (Martins, 2020), Talent/Giftedness Indicator Identification Questionnaire (Freitas & Pérez, 2012), Base List of Indicators of Giftedness (Delou, 1987), Giftedness and Talent Identification Scale (Freitas et al., 2017), Guide for Direct Observation in the Classroom (Guenther, 2014). In addition to these, the adaptation process of other international instruments can also be found: Renzulli Scale for Assessing the Behavioral Characteristics of Talented Students (Rondini et al., 2022), Giftedness Rating Scale (Nakano & Siqueira, 2012) and the Hope Scale (Rondini et al., 2022).

The difference between the instruments and the one presented here is supported by the fact that, unlike the others, this one proposes to assess a specific type of talent/giftedness more deeply, thus making use of different areas in which a high intellectual potential can manifest (Farias, 2012). The others assess different areas, not being so specific and covering behaviors related to intellectual giftedness in general. To differentiate from the existing ones, the items were developed based on the 10 broad domains of the theoretical model of cognitive skills known as Cattell-Horn-Carroll (CHC). This model consists of a standard nomenclature for discussing cognitive skills (McGill & Dombrowski, 2019), providing a comprehensive taxonomy for currently known cognitive skills (McGrew, 2009), and it is widely recognized as a model that goes beyond measuring general IQ (McGrew et al., 2023).

The CHC constitutes a hierarchical model of intelligence, composed of three strata (Figure 1). In the first of them a general intelligence factor would be located, followed by 10 broader factors and about 60 specific factors, linked to the specific abilities evaluated in intelligence tests (Bryan & Mayer, 2020).

Figure 1

CHC model for intelligence (McGrew, 2009)

	Stratum 3 General Intelligence Factor (G)									
Stratum 2 Broad Factors	**(Gf)** Fluid Intelligence / Reasoning	**(Gc)** Crystallized Intelligence	**(Gq)** Quantitative Knowledge	**(Gsm)** Short-term Memory	**(Glr)** Long-term memory storage and retrieval	**(Gv)** Visual Processing	**(Ga)** Auditory Processing	**(Gs)** Processing and execution speed	**(Gt)** Reaction and decision speed	**(Grw)** Reading and Writing
Stratum 1 Specific Factors	◆ Induction (I) ◆ Speed of reasoning (RE) ◆ General sequential reasoning (RG) ◆ Quantitative reasoning (RQ) ◆ Piagetian reasoning (RP)	◆ Language development (LD) ◆ Lexical knowledge (VL) ◆ Listening ability (LS) ◆ General (verbal) information (K0) ◆ Information about culture (K2) ◆ General science information (K1) ◆ Geography achievement (A5) ◆ Communication ability (CM) ◆ Oral production and fluency (OP) ◆ Grammatical sensibility (MY) ◆ Foreign language proficiency (KL) ◆ Foreign language aptitude (LA)	◆ Mathematical knowledge (KM) ◆ Mathematical achievement (A3)	◆ Memory span (MS) ◆ Learning abilities (LI) ◆ Working memory (MW)	◆ Associate memory (MA) ◆ Meaningful memory (MM) ◆ Free recall memory (M6) ◆ Ideational fluency (FI) ◆ Associational fluency (FA) ◆ Expressional fluency (FE) ◆ Naming facility (NA) ◆ Word facility (FW) ◆ Figural fluency (FF) ◆ Figural flexibility (FX) ◆ Sensitivity to problems (SP) ◆ Originality, creativity (FO) ◆ Learning abilities (LI)	◆ Visualization (VZ) ◆ Spatial relations (SR) ◆ Visual memory (MV) ◆ Closure speed (CS) ◆ Flexibility of closure (CF) ◆ Spatial scanning (SS) ◆ Serial perception integration (PI) ◆ Length estimation (LE) ◆ Perceptual illusions (IL) ◆ Perceptual alternations (PN) ◆ Imagery (IM)	◆ Phonetic coding (PC) ◆ Speech sound discrimination (US) ◆ Resistance to auditory stimulus distortion (UR) ◆ Memory for sound patterns (UM) ◆ General sound discrimination (U3) ◆ Temporal tracking (UK) ◆ Musical discrimination and judgement (U1, U9) ◆ Maintaining and judging rhythm(U8) ◆ Sound intensity/ duration discrimination (U6) ◆ Sound-frequency discrimination (U5) ◆ Hearing and speech threshold factors (UA, UT, UU) ◆ Absolute pitch (UP) ◆ Sound localization (UL)	◆ Perceptual speed (P) ◆ Rate of test-taking (R9) ◆ Number facility (N)	◆ Simple reaction time (R1) ◆ Choice rection time (R2) ◆ Semantic processing speed (R4) ◆ Mental comparison speed (R7).	◆ Cloze ability (CZ) ◆ English usage knowledge (EU) ◆ Reading Comprehension (RC) ◆ Reading decoding (RD) ◆ Reading speed (RS) ◆ Spelling ability (SG) ◆ Verbal (printed) language comprehension (V) ◆ Writing ability (WA)

Source: Farias, ES, Nakano, TC, & Wechsler, SM. (2023).

* **(Gp)** Psychomotor ability	Static strength, limb coordination, dexterity with finger movements, dexterity with hand movements, stability in hand-arm movements, control and precision, visual control and body balance.
* **(Gps)** Psychomotor speed	Speed of limbs and joint movements. Fluency in writing. Moving time.
* **(Go)** Olfactory ability	Olfactory memory and sensitivity
* **(Gh)** Tactile (haptic) ability	Tactile sensitivity
* **(Gk)** Kinesthetic ability	Kinesthetic sensitivity
* General knowledge of specific domains	

*These six broad factors are being included in the CHC model.

The choice for this theoretical model as the basis for the scale is grounded on the hypothesis that the specific cognitive skills which make up intelligence are more important than the general intelligence itself (Geisinger, 2019), being considered more informative than the General IQ (Cormier et al., 2016). In addition, the literature has shown that the CHC model has influenced, in recent decades, theories of intelligence, the development of tests to assess this construct and research on the subject (McGrew, 2023).

Therefore, the present study aimed to report the construction process of a naming scale by teachers of talented/gifted students of the intellectual kind, according to the theoretical model of intelligence known as CHC. More specifically, it presents the results of the search for evidence on the instrument content validity.

Method

Participants

Five evaluators who attended a graduate program in Psychology, specifically in psychological assessment and instrument construction areas, and who knew the CHC model of intelligence. Of these, four were female, two doctors, two doctoral students and one specialist.

Instrument

Intellectual Gifted Naming Scale: teacher version (ENDI-p). Screening-type scale for identifying talent/gifted students to be answered by the teacher (Farias, 2012). This is an instrument built to help teachers in the process of identifying talent/giftedness in the intellectual area of their students enrolled in elementary school. The version used here has 80 items, organized according to the ten CHC domains, each domain having eight items (four negative and four positive ones), as follows:

1. *Fluid intelligence (Gf)*: positive items: 1, 12, 31, 53 and negative items: 3, 10, 47, 73. Example item: "Easily deals with abstract concepts".
2. *Crystallized intelligence (Gc)*: positive items: 13, 20, 48, 43 and negative items: 23, 76, 68, 41. Example item: "Easily deals with general knowledge content".
3. *Quantitative knowledge (Gq)*: positive items: 58, 59, 26, 37 and negative items: 61, 7, 77 and 28. Example item: "Prefers exercises involving numbers".
4. *Short-term memory (Gsm)*: positive items: 19, 18, 17, 16 and negative items: 40, 2, 75, 55. Example item: "Is able to remember what has been learned recently".
5. *Long-term memory storage and retrieval (Glr)*: positive items: 46, 21, 66, 67 and negative items: 5, 70, 39, 71. Example item: "Easily remembers past events".
6. *Visual processing (Gv)*: positive items: 57, 54, 49, 32, negative items: 2, 4, 72, 14. Example item: "Perceives spaces coherently".
7. *Auditory processing (Ga)*: positive items: 44, 56, 45, 27 and negative items: 51, 69, 50, 9. Example item: "Easily identifies sounds (rhythms)".
8. *Processing and execution speed (Gs)*: positive items: 22, 29, 78, 33 and negative items: 65, 30, 62, 35. Example item: "Demonstrates speed in understanding simple facts".

9. *Reaction and decision speed (Gt)*: positive items: 79, 64, 15, 74 and negative items: 8, 63, 24, 36. Example item: “Quickly makes decisions on complex issues”.
10. *Reading and writing (Grw)*: positive items: 42, 80, 38, 34 and negative items: 60, 52, 11, 6. Example item: “Uses elaborate vocabulary in his essays”.

Proceedings

Initially, the project was approved by the research ethics committee (CAAE 0124.0.147.000-11). The reviewers received a form explaining the purpose of the research, the task to be performed by each reviewer and the definition of each of the 10 domains, to support their evaluation. The task involved reading the items and reviewing which of the CHC domains the item represented. The forms used in this process can be accessed at Farias (2012).

To prevent the items from being grouped according to the assessed areas, a list was randomly organized. Teachers were instructed to answer the ENDI-p by evaluating their students (elementary school), regardless of the age these students were at the time.

Data analysis

A spreadsheet with the results of each reviewer was prepared. Initially, the percentage of agreement for each item and later for each dimension was calculated. To interpret the results, the agreement criterion of at least 80 % among the reviewers was adopted to indicate the adequacy and pertinence of the item (Pasquali, 2010).

The items that obtained such a value were considered adequate and selected to compose version 2 of the instrument. Those below this percentage were excluded. A third possibility involved relocating the item to another area, different from the one for which it was originally developed in case the reviewers agreed (above 80 %).

As criteria for interpreting the results, the percentage of agreement, the values defined by Landis and Koch (1977): almost perfect agreement, .80 to 1; substantial agreement, .60 to .80; moderate agreement, .40 to .60; fair agreement, .20 to .40; discrete agreement, 0 to .20. Regarding the Kappa coefficient, the recommendations by Fleiss et al. (2003) were followed: above .75 = excellent agreement; between .40 and .75 = satisfactory agreement; below .40 = unsatisfactory agreement.

Results

Initially, the percentage of agreement between reviewers was estimated. In general, the results showed the adequacy of the items to the domains they are intended to measure, according to the reviewers' assessment (73.75 % of the items). Another 21 items (26.25 %) did not reach the desired agreement percentage.

Considering each area, the items that were not consensual belonged to the following domains: fluid intelligence (n = 5), crystallized intelligence (n = 5), quantitative knowledge (n = 1), short-term memory (n = 4), long-term memory storage and retrieval (n = 1), processing and execution speed (n = 2), reaction and decision speed (n = 2) and read/write speed (n = 1). The visual processing and auditory processing dimensions presented adequacy in all its items. The results are shown on Table 1.

Table 1

Agreement Percentage among Reviewers (Juiz) by area and item

Item	Juiz1	Juiz2	Juiz3	Juiz4	Juiz5	IC
Area 1: fluid intelligence (Gf)						
+1	1	1	1	1	2	80
+12	1	1	1	1	1	100
+53	1	9	1	1	9	*60
+31	2	1	1	1	2	*60
-10	2	1	2	1	2	*60
-47	1	1	1	1	1	100
-73	1	9	9	1	9	*60
-3	2	1	1	2	1	*60
Area 2: crystallized intelligence (Gc)						
+13	2	2	2	2	1	80
+20	5	2	5	2	2	*60
+48	2	2	2	2	2	100
+43	1	8	2	1	2	*40
-23	9	2	2	2	1	*60
-76	2	1	2	1	1	*60
-68	2	2	5	2	1	*60
-41	1	1	2	1	1	80
Area 3: quantitative knowledge (Gq)						
+58	3	3	3	3	3	100
+59	3	3	3	3	3	100
+26	7	3	3	3	3	80
+37	3	3	3	3	3	100
-61	3	3	3	3	3	100
-7	3	3	3	3	3	100
-77	3	3	3	3	3	100
-28	3	7	3	7	3	*60
Area 4: short-term memory (Gsm)						
+19	2	4	4	4	4	80
+18	5	4	4	5	4	*60
+17	4	4	2	4	4	80
+16	2	1	1	8	1	*60
-40	4	4	4	4	4	100
-25	3	4	4	4	6	*60
-75	4	4	4	4	4	100
-55	4	1	4	8	4	*60
Area 5: log-term memory storage and retrieval (Glr)						
+46	5	5	5	5	4	80
+21	8	2	6	2	1	*40
+66	4	5	5	5	5	80
+67	5	5	5	5	5	100
-5	5	5	5	5	5	100
-70	5	2	5	5	5	80
-39	4	5	5	5	5	80
-71	5	2	5	5	5	80

Item	Juiz1	Juiz2	Juiz3	Juiz4	Juiz5	IC
Area 6: visual processing (Gv)						
+57	1	6	6	6	6	80
+54	6	6	6	6	8	80
+49	6	6	6	6	6	100
+32	6	6	6	6	6	100
-2	3	3	3	3	3	100
-4	6	6	6	6	6	100
-72	6	6	6	6	6	100
-14	6	6	6	6	6	100
Area 7: auditory processing (Ga)						
+44	7	7	7	7	7	100
+56	7	7	7	7	7	100
+45	7	7	7	7	7	100
+27	3	7	7	7	7	80
-51	7	7	7	7	7	100
-69	7	7	7	7	7	100
-50	7	7	7	7	7	100
-9	7	7	7	7	7	100
Area 8: processing and execution speed (Gs)						
+22	2	8	8	8	8	80
+29	8	8	8	8	8	100
+78	8	8	8	8	8	100
+33	8	8	9	8	8	80
-65	8	8	8	8	8	100
-30	8	9	1	8	1	*40
-62	8	8	8	8	8	100
-35	2	8	1	8	8	*60
Area 9: reaction and decision speed (Gt)						
+79	9	9	8	9	9	80
+64	9	9	9	9	9	100
+15	1	8	9	9	9	*60
+74	9	9	9	9	9	100
-8	9	8	8	9	9	*60
-63	9	9	9	9	9	100
-24	4	9	9	9	9	80
-36	9	9	8	9	9	80
Area 10: reading and writing (Grw)						
+42	10	10	10	10	10	100
+80	2	10	10	10	10	80
+38	10	10	10	10	10	100
+34	10	10	10	10	10	100
-60	10	10	10	10	10	100
-52	2	10	10	2	10	*60
-11	10	10	10	10	10	100
-6	10	10	10	10	10	100

Source. Farias, 2012.
* Removed items.
**Items that reached an agreement in another dimension.

Two items showed agreement in other dimensions, different from the ones originally thought. This was the case for two items: item 41 of the crystallized intelligence domain, which was relocated to the fluid intelligence domain, item 2 of visual processing, which was classified as quantitative knowledge. Such items were reallocated to the dimension indicated by the reviewers.

Thus, after the reviewers' evaluation, the second version of the scale was composed of 59 items. Analyzing the results of each area, Gc with 2 items (25 % of the number of initial items), Glr, Gv and Grw with 7 items each (87.5 %), Gf and Gsm with 4 items (50 %), Ga and Gq with 8 items (100 %), Gs and Gt with 6 items each (75 %).

Then, the estimate of the Kappa coefficient was carried out, with the purpose of verifying the intensity of agreement between the evaluators. For this reason, the classifications made by the reviewers were crosschecked with an “ideal reviewer” (the original dimensions of the items). The number of items classified in each of the domains was estimated, as well as the number and the percentage of correct answers in the classifications. The results are shown on Table 2.

Table 2

Theoretical Dimension Verified by the Kappa Coefficient

Kappa		Gf	Gc	Gq	Gsm	Glr	Gv	Ga	Gs	Gt	Grw
Reviewer 1	Nº items	9	13	10	7	7	6	8	7	7	6
	Right answers	5	4	7	4	5	6	7	6	6	6
k=.667	% right answers	62,5	50	87,5	50	62,5	75	87,5	75	75	75
Reviewer 2	Nº items	10	8	8	6	5	7	9	10	9	8
	Right answers	6	5	7	6	5	7	8	7	6	8
k=.792	% right answers	75	62,5	87,5	75	62,5	87,5	100	87,5	75	100
Reviewer 3	Nº items	9	8	9	6	10	7	8	8	7	8
	Right answers	6	6	8	6	8	7	8	5	5	8
k=.819	% right answers	75	75	100	75	100	87,5	100	62,5	62,5	100
Reviewer 4	Nº items	10	8	8	5	8	7	9	10	8	7
	Right answers	7	5	7	5	7	7	8	8	8	7
k=.847	% right answers	87,5	62,5	87,5	62,5	87,5	87,5	100	100	100	87,5
Reviewer 5	Nº items	11	6	9	7	6	7	8	8	10	8
	Right answers	3	3	8	6	6	6	8	7	8	8
k=.764	% right answers	37,5	37,5	100	75	75	75	100	87,5	100	100

Notes. Fluid intelligence (Gf), Crystallized intelligence (Gc), Quantitative knowledge (Gq), Short-term memory (Gsm), Long-term memory storage and retrieval (Glr), Visual processing (Gv), Auditory processing (Ga), Processing and execution speed (Gs), Reaction and decision speed (Gt), Reading and writing (Grw).

The results presented that all reviewers showed satisfactory agreement according to the values established in the literature (Fleiss et al., 2003). Four reviewers (reviewer 2, 3, 4 and 5) obtained agreements considered excellent, while reviewer 1 reached an agreement considered satisfactory. In general, the reviewer who presented the highest percentage of correct answers, considering all areas, was reviewer 4, who presented an agreement equal to or above 87.5 % in eight of the ten areas. On the other hand, the reviewer who presented the worst performance was reviewer 1, whose percentage of correct answers was higher only in two areas.

If analyzed separately, in each dimension there was a hit above 87.5 % in the judgment of the reviewers: quantitative knowledge (five reviewers) and auditory processing (five reviewers). On the other hand, the areas of fluid intelligence (only one reviewer) reaction and decision speed (two reviewers) grouped the items that had a lower percentage of correct answers by the reviewers, possibly indicating other doubts.

Discussion

After the selection process of the theoretical model that would support the scale items for identifying academic giftedness/talent indicators, having selected the most complete and current theoretical model of intelligence, the CHC model, the scale items were constructed. In this sense, eight items were initially created for each of the areas that make up the broad dimensions of the model.

Subsequently, the search for evidence to validate the scale construct was executed using two different methods: percentage of agreement (which reviews the quality of the items according to experts) and Kappa coefficient (which reviews the qualification of the reviewers). The analysis of the items, by expert reviewers in the psychological assessment, intelligence, or instrument construction areas, indicated the adequacy of most of them (73.25 %).

This step proved to be fundamental to help the researchers in the selection of items which proved to be adequate. It also helped them in the exclusion of those that, according to the reviewers' assessment, were not clear, thus not reaching the expected agreement value. The fact that two areas, related to visual and auditory processing, reached an agreement of the reviewers in all their items is noteworthy. This leads us to believe that both the definition presented for such domains, as well as the items created to represent such cognitive abilities, seem clear and adequate.

Another four areas lost only one item (quantitative knowledge, visual processing, long-term memory storage and retrieval, and reading and writing), so they were represented in the items that were selected. They continued to present an adequate number of items in the instrument, suggesting difficulties with specific items.

On the other hand, the areas of fluid and crystallized intelligence were the ones that presented the greatest losses, where only four and two items remained, respectively. Crystallized intelligence is that ability that allows solving problems based on acquired knowledge and past experience, while fluid intelligence refers to the ability to solve challenging problems based on abstract thinking and pattern recognition (Simpson-Kent et al., 2020). Interestingly, it should be noted that both types of intelligence are most commonly evaluated in intelligence models and in tests that measure such constructs, given the idea that these two types can be considered more elementary intelligence skills (Horn, 1972). Due to this fact, it was expected that these would be areas in which the reviewers would not face difficulties, presenting a better performance.

However, in the study presented here, they were the ones that achieved the poorest results. This was not in line with expectations, since the evaluators had more difficulty correctly reviewing their items. In face of this situation, it is necessary to assess whether the low level of agreement in such areas was due to difficulties in the content expressed by the items, the inadequacy of the definition provided as a basis for the review or the lack of mastery of the reviewers over such dimensions. Studying future items in this area, providing a better definition, and offering more precise items can help to expand the number of items to include even those selected in the other dimensions. Only after this review can the scale evenly assess the ten domains of the CHC model that it proposes to follow.

During the course of a school year / period, teachers spend a considerable amount of time with their students, so building a tool that they can later use is important. Precisely for this reason, once trained, they will be able to observe (based on science and thus, reduce subjective bias) student behavior, indicating strengths and weaknesses. Strengths, if understood as potential talent/giftedness, can be developed, and reflected in excellent performance, regardless of the area. Furthermore, weaknesses should be addressed, so that curricular adjustments can be made to improve children's learning of that type of intelligence, and the relationship between that intelligence and day-to-day practice. Such scenario generally favors the involvement and interest of students.

Final considerations

The study consists in presenting a proposal for a new instrument to identify a specific type of talent/giftedness (of the intellectual kind), based on a broader and more recognized model of intelligence, the CHC model. The choice of this model as a theoretical foundation for the scale has the advantage of identifying behaviors related to different types of intelligence, whose potentials may be proven to be high to the extent that a possible giftedness can be characterized.

It is important to emphasize that the results presented here constitute an initial investigation of the psychometric qualities of the instrument under development, limited to the investigation of evidence for the construct validity. More specifically, it enabled to investigate the clarity, representativeness and relevance of the items developed for a talent/giftedness screening scale, to be answered by teachers concerning their students in elementary school.

In order to seek refinement for the ENDI-p, other studies aimed at investigating its psychometric qualities are necessary, and other sources of evidence validity can be cited (through internal structure, item analysis or relationship with external variables), as well as its accuracy.

Despite the favorable results presented here, some limitations of the study can be mentioned. Among them, an important reduction in the number of items to assess fluid and crystallized intelligence, also, new items to assess these areas will need to be created. Such an action may involve reformulating the items that were excluded, writing new items, improving the definition of the area and, subsequently, conducting a new study with other expert reviewers in the field of intelligence. However, it is important to point out that the items belonging to the other eight dimensions showed adequate results, for the sake of motivating researchers to continue studies with the scale.

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