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Paper

Identification of Creative and Intellectual Talent in the Classroom

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Abstract

In order for the school to fulfill the role of talent development, it is necessary to identify them. Therefore, this study compared the identification of creative and intellectual talents by teachers with psychological test results and the influence of gender in the process. Ten teachers (F10) and 120 students (F62), aged between 9 and 11 years old, participated in two private schools in the metropolitan region of Campinas, SP. The instruments had used the Teacher Talent Identification Scale (ITP), and the Intelligence and Creativity Assessment Kit for Children (BAICI). Both measure verbal, spatial, logical, rapid thinking, memory, and creativity. Pearson's correlation showed that the subtests of verbal comprehension, visual memory and creativity had significant relationships with BAICI'stotal cognitive index. No significant differences had found by sex. The need to train teachers for a more timely and assertive identification of talents has been realized in order to better develop them.
Keywords: Intelligence; high skills; psychological assessment.

Identificación de talento creativo e intelectual en la sala de clases

Resumen

Para que la escuela desarrolle talentos, el profesor debe ser capaz de identificarlos. Siendo así, el estudiocomparó la identificación de talentos creativos e intelectuales por profesores con resultados de pruebas psicológicos y verificó la influencia de sexo en el proceso. Participaron 10 profesores (F10) y 120 estudiantes (F62, M58), con edades entre 9 y 11 años de dos escuelas particulares del interior de São Paulo. Los instrumentos utilizados fueron: Escala Identificación de Talentos por el Profesor (ITP), y Batería de Evaluación de la Inteligencia y Creatividad (BAICI), que miden las áreas: verbal, espacial, lógico, velocidad de raciocinio, memoria y creatividad. La correlación de Pearson apuntó que los subpruebas de comprensión verbal, memoria visual y creatividad tuvieron relaciones significativas con el índice cognitivo total de la BAICI. No fueron encontradas diferencias significativas por sexo en la identificación por los profesores. Se percibió la necesidad de orientar profesores para mejor identificar talentos y de estimularlos en ambos sexos.
Palabras clave: Inteligencia; altas habilidades; evaluación psicológica.

Identificação de Talento Criativo e Intelectual na Sala de Aula

Resumo

Para que a escola cumpra o papel do desenvolvimento de talentos, é preciso identificá-los. Sendo assim, o estudo comparou a identificação de talentos criativos e intelectuais por professores com resultados de testes psicológicos e a influência de sexo no processo. Participaram 10 professores (F10), e 120 estudantes (F62), com idades entre 9 e 11 anos de duas escolas particulares na região metropolitana de Campinas, SP. Os instrumentos foram: a Escala Identificação de Talentos pelo Professor (ITP), e a Bateria de Avaliação da Inteligência e Criatividade, Infantil (BAICI). Ambas medem as áreas verbal, espacial, lógico, rapidez de raciocínio, memória e criatividade. A correlação de Pearson apontou que os subtestes de compreensão verbal, memória visual e criatividade tiveram relações significativas com o índice cognitivo total da BAICI. Não foram encontradas diferenças significativas por sexo. Percebeu-se a necessidade de capacitar professores para uma identificação mais pontual e assertiva de talentos a fim de melhor desenvolvê-los.
Palavras-chave: Inteligência; altas habilidades; avaliação psicológica.

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Introduction

The term "talent", sometimes used as a synonym for high skills / giftedness by National Special Education Policies (Resolution No. 02/2001, 2001), is related to superior mastery of systematically developed skills and knowledge, ease of learning, mastery of abstract concepts, curiosity, persistence, focused attention, creativity, imagination, originality, good memory, advanced vocabulary for chronological age, leadership ability etc. (Brazil, 2007; Gagné & Güenther, 2012). In this sense, those who are talented stand out for their intellectual, social, affective, creative and sensory motor skills, as well as presenting personological and motivational aspects in a peer group of the same age group (Renzulli & Reis, 1997; Wechsler, 2008).

Two talents are analyzed in this study, the creative and the intellectual. The creative is manifested by the originality of thought, generation and communication of new ideas, fertile imagination, and search for problem solving, sensitivity to environmental issues, divergent and relevant ideas, and feelings of challenges facing the complexity of facts (Renzulli, 2014; Sternberg & Kaufman, 2010; Torrance, 1984). The cognitive flexibility is also decisive in the creative person; it opens up new ideas (Lin, Tsai, Lin, & Chen, 2014), and when associated with nonconformity, induces originality (Amabile, 1996). The creativity is therefore a multidimensional construct; it involves the interaction between individuals and cognitive variables, thinking styles, personality characteristics, and environmental and cultural elements (Wechsler, 2008). The productive creative people are even more knowledge producers than consumers, which makes them truly talented according to Renzulli (2005).

Intellectual talent, in turn, is related to high potential in one or more areas that include intelligence such as logical and abstract reasoning, flexibility and fluency of thought, verbal and spatial skills, high memory, quickness of mind and ability to think, solving and dealing with problems (Brasil, 2007; Mosqueira, Stobäus, & Freitas, 2013). Those who are academically talented usually learn by deduction, have more structured thinking, demonstrate ability to acquire and retrieve information, stand out for their verbal ability, critical thinking and problem solving allied to curiosity and manipulation of large amounts of information (Davis & Rimm, 2004; Renzulli, 2014). The intellectual is the easiest talent to be identified by IQ tests; the measured skills are the same as those required in the school context (Renzulli, 2005).

Identifying talent is a big challenge. It requires judicious methods, must be grounded in current concepts and theories, comply with a sequence of careful and systematic observation and care procedures, make use of appropriate instruments, and receive support from the school (Nakano, Campos, & Santos, 2016; Pocinho, 2009; Reyero & Tourón, 2000). Such aspects are only obtained through training of teachers and professionals (Pérez & Freitas, 2014) which, incidentally, is one of the most important and consistent contributions to education (Araújo, 2011; Virgolim & Konkiewitz, 2014; Wechsler & Souza, 2011). The use of tests and measurements must meet the international scientific standards proposed by the *International Test Commission* (2001) and required by the Federal Council of Psychology (2007, 2010). These refer to the presentation of empirical data of indicators of evidence of validity and accuracy, as well as norms established for a specific population (Elosua, 2017, Geisinger, 2013).

There is no consensus on the type of instrument to identify talent. It is observed that the greater their variety and procedures, the greater the amount of information about the student and their potential (Mendonça, 2015; Simonetti, Almeida, & Güenther, 2010). For example, according to Renzulli (2005), the differentiation between scholarly/intellectual giftedness and creative-productive giftedness is best achieved through deductive learning tests and processes, structured training in thinking, acquiring, stocking, and retrieving information processes, which makes measures such as psychological tests, observation scales, teachers' perceptions, students' products, self-report, peer evaluation, parental report etc. (Renzulli & Reis, 1997; Wechsler & Suárez, 2016).

It is necessary to pay attention to the myths surrounding the process of identifying talent. These prevent them from recognizing and meeting special educational needs (Azevedo & Mettrau, 2010; Reis & Renzulli, 2009). As for sex, for example, there may be the myth that talent manifests itself in a homogeneous group usually male (Antipoff & Campos, 2010; Reis & Renzulli, 2009; Virgolim, 2014), or that women cannot exercise their talents in certain areas because they are "male" (Mundim, Wechsler, & Primi, 2013). Elements of culture, such as values and beliefs, maintain or reinforce sexual stereotypes, constituting external and internal barriers, such as lower female encouragement of ideas, fear of success, perfectionism or limited belief in one's potential (Alencar & Fleith, 2009; Prado & Fleith, 2012). It should be noted that human potential is distributed in the world population without socioeconomic, ethnic and gender differentiation, which is why each school environment must be enriched and challenges higher capacity (Antipoff & Campos, 2010; Prado, Alencar, & Fleith, 2016; Reis & Renzulli, 2009).

Among the most well-known conceptions of talent identification is Renzulli's Three Ring Model (2005, 2014). Its purpose is to introduce into the school curriculum an expanded program of opportunities that both meets and provides resources and support for meaningful, investigative learning. The Model proposes that talented are those who have above average skill relative to their peers in one or more areas of intelligence; high level of involvement with the task, in other words, high level of motivation and commitment, and; high creativity. In this dynamic interaction, each ring is a way of both identifying and developing talent (Renzulli, 2004). The rings are set against the background of family, classmates and the school itself representing the interplay of environmental and personality factors that favor the emergence of giftedness and talent (Renzulli, 2004, 2014).

On measuring creative talent, Torrance's (1990) Creative Thinking Tests are among the most widely used both nationally and internationally (Wechsler & Souza, 2011). Translated and validated in over 33 countries (Baer & Kau-

fman, 2006), they bridge the gap in assessing creativity in children and adolescents (Nakano, 2012), and articulate barriers to expression of this talent caused by inhibiting educational practices (Alencar & Fleith, 2009).

Among the theoretical models, that best explain the functioning of intellectual ability or talent is the Hierarchical Theory of Intelligence. It combines theoretical proposals from three area researchers, Cattell-Horn-Carrol, and generates a Three Stratum model named, McGrew's CHC (2009). Stratum 1 refers to singular and higher level aptitude that corresponds to a single general intelligence, described as factor "g" (Wechsler & Schelini, 2006), 2 comprises the denominated intermediate aptitudes, or specific capacities (Primi, 2003) and stratum 3 is composed of resulting factors common to different specifications (McGrew & Flanagan, 1998).

After extensive evaluation that resulted in the CHC theoretical model, there was a call for a general reassessment of intelligence measures (Wechsler, Nunes, Schelini, Ferreira, & Pereira, 2010; Woodcock, McGrew & Mather, 2001). From this assessment, researchers concluded that the Woodcock-Johnson III Battery - WJ III, which provides a set of tests to measure overall intellectual ability, specific cognitive skills, scholastic aptitude, oral language, and academic performance, was the instrument that best assessed intellectual functioning (Wechsler, Vendramini, & Schelini, 2007; Woodcock et al., 2001). Currently, there are several studies conducted in Brazil that analyze evidence of the validity of the WJIII Battery (Chiodi & Wechsler, 2009; Wechsler & Schelini, 2006; Wechler et al., 2010, among others). From the WJIII review process came Wechsler's (2009) Battery for Assessing Intelligence and Creativity - adult (BAICA), validated in Brazil by Millian and Wechsler (2018), which compared their subtests with those already validated and which measure the same areas, but in isolation. A proposal for the integrated assessment of intelligence and creativity in children is offered through the Intellectual and Battery for Assessing Intelligence and Creativity – child - BAICI, and its validity is investigated here.

Considering, therefore, the need to use different measures for the identification of talents, this study verified whether there was a relationship between the perception of talents by teachers and the results obtained in the BAICI objective tests, as well as if there were gender differences in the indications of talent by teachers through the ITP Scale.

Method

Participants

The study included 10 4th and 5th grade elementary school teachers from two private schools in the metropolitan region of Campinas, SP, and 120 students (F = 62), aged between 9 and 11 years, (M = 9.66; SD = 0.58). The samples were obtained for convenience insofar as they required acceptance, availability of time, and cooperation from the direction and coordination for teachers and students to participate in the study. The teachers (N = 10), six were regents (4th and 5th years), two were English and two were art teachers aged 24 to 52 years, and teaching time 5 to 25 years.

Instruments

1. Teacher Talent Identification Scale - ITP aims to obtain the teacher's perception or indication of creative and intellectual talents. This is a *Likert* scale (1 "never observed" and 5 "always observed"), consisting of 30 original items. Its construction was based on the literature about the areas of intelligence according to the theory of the CHC, namely: Verbal Understanding, Thinking or Visuospatial Reasoning, Logical Thinking, Speed of Reasoning, Memory and Creative Thinking. This scale is in *likert* format and has had its validity and accuracy already investigated and confirmed in studies by Suárez and Wechsler (2019).

2. Wechsler's (2018) Battery for Assessing Intelligence and Creativity (BAICI) aims to evaluate intellectual and creative dimensions. The items were constructed from the Woodcock-Johnson III drums (WJ III), and from subsequent studies by Wechsler (Wechsler, 2018; Wechsler et al., 2010; Wechsler & Schelini, 2006; Wechsler, Vendramini, & Schelini, 2007). It has 6 subtests administered in the form of specific notebooks and applied collectively. The areas evaluated are: verbal comprehension, measuring crystallized intelligence (Gc); visuospatial test, visuospatial intelligence (Gv); logical thinking test, fluid intelligence (Gf); auditory visual memory test, short-term or working memory (Gsm); reasoning speed test, speed of processing (Gs) and finally the creative thought test, both figurative and verbal that measures divergent thinking.

Procedure

The project was submitted to the Institutional Research Ethics Committee and the protocol number obtained is 443.518, registered under CAAE 22737713.2.0000.5481. Formal and ethical measures were taken through Informed Consent Terms for each school board and parents or guardians. The teachers completed the ITP Scale for each of the 120 students, and in order to adapt the request to their time availability, they had two weeks to return the instrument. Students responded collectively to BAICI Battery subtests respecting the time assigned to each. There were three meetings with the students. In each one, which lasted 50 minutes, two BAICI subtests were applied. In the days of its application there was always a conducting teacher accompanying the meeting. The students who did not obtain permission from parents / guardians or did not want to participate, performed physical and artistic activities with a professional of the institution in another space of the school.

The BAICI subtests were analyzed separately and summed by the Total Cognitive Index. In addition, the sum of

the results by the ITP Scale generated the Cognitive Index. Subsequently each of the ITP Scale results were compared with the BAICI subtests by Pearson correlation. Univariate Analysis of Variance analyzed the gender differences in teacher appointment.

Results

Regarding the analysis of teachers' perception of talent through the ITP Scale and illustrated in **Table 1**, despite the fact that females obtained more indications, it was verified through the ANOVA analysis that significant differences between genders occurred only for the subtest Visual Memory, ($\alpha = 5.66$; $p \leq 0.05$), highlighting the female gender. By analyzing the results regarding BAICI's cognitive subtests, it was noticed that the girls had superior results in the spatial, logical, reasoning and cognitive index tests. The boys, in turn, excelled in verbal tests and visual memory. Through the ANOVA analysis it was found that the gender variable was not significant in any of the subtests, reinforcing the hypothesis of no significant difference between the sexes through the teachers' perception.

Regarding the verbal (fluency, elaboration, originality) and figurative (fluency, originality and expressive title) creative abilities of BAICI, values found on average showed that girls again had superior results in most analyzes, except in the measure of fluency (BACVFlu), where males obtained superior results. However, ANOVA analysis showed no significant difference.

Evidence of BAICI validity by external criteria was verified by comparing the results in their subtests with those obtained in the ITP Scale. According to **Table 2,** the perception of teachers by the ITP Scale was significantly related to the total cognitive index in the following skills: Verbal ($r = 0.49$, $p \leq 0.01$), Memory ($r = 0.33$, $p \leq 0, 01$) and creativity ($r = 0.21$, $p \leq 0.05$) and the Cognitive Index ($r = 0.27$, $p \leq 0.05$). It is concluded that teachers observe these skills better than others do such as visuospatial thinking, and logical thinking, for example. Among the BAICI subtests, the one that obtained the highest correlation with the ITP Scale results was the Speed of Reasoning ($r = 0.25$).

Possibly this ability is more related to the fact that each of the subtests involves a set time. Interestingly, this subtest showed no significant correlation with the total index. Repeated measurements on both instruments showed both significant and non-significant correlation. Among the significant ones the Space subtest ($r = 0.23$); Speed of Reasoning ($r = 0.25$); Total Cognitive Index and Total Cognitive Index ($r = 0.27$), and Creative Index ($r = 0.25$). As for those that were not significant, and even negative, we are subtests: verbal ($r = 0.07$); Logic ($r = -0.09$); and Visual Memory ($r = 0.19$).

As for the internal consistency of the BAICI subtests, the highest correlation occurred between the Visual Memory subtest and the Total Cognitive Index ($r = 0.79$). Also significant were the relationships between the Verbal and Total Cognitive subtests ($r = 0.43$); Spatial subtest and Speed of Thought ($r = 0.30$), Spatial and Total Creativity (0.43); and finally, Total Cognitive and Total Creativity ($r = 0.37$), correlating creativity with intelligence.

Discussion

The creativity and intelligence constructs, essential for cognitive functioning (Torrance, 1984), have pointed to both positive (Nakano, 2012) and moderate, low or no correlation (Elisondo & Donolo, 2010; Nakano et al., 2015;

Table 1. *Rates and standard deviations of the Teacher Talent Identification (ITP) scale.*

Habilities	Total		Female		Male	
ITP	Rate	SD	Rate	SD	Rate	SD
Verbal	27,48	5,85	27,82	5,63	27,10	6,10
Spatial	18,68	4,05	19,31	3,86	18,00	4,18
Logic	17,93	4,77	18,60	4,62	17,21	4,86
Reasoning speed	14,23	4,69	14,87	4,51	13,53	4,85
Visual memory	18,19	4,86	19,19	4,42	17,12	5,11
ITP Cognitive index	96,49	21,52	99,79	20,86	92,97	21,83
ITP Creative index	44,53	7,55	45,32	7,07	43,69	8,00

Source: Researchers themselves. Cognitive Index - sum of verbal, spatial, logical cognitive skills, speed of reasoning and visual memory; Total creative index of questions related to creativity.

Table 2. *Pearson correlation between ITP and BAICI subtests.*

ITP\BAICI	Verbal	Spatial	Logicc	Speed rea.	Visual Me.	Total cog.	Total Cre
Verbal	0,07	**0,26***	0,12	**0,31***	**0,29***	**0,49***	0,15
Spatial	0,15	**0,23***	-0,01	**0,27***	-0,06	0,15	**0,28***
Logic	0,05	0,013	-0,09	**0,22***	**0,21***	0,19	-0,02
Speed Rea.	0,08	0,13	-0,01	**0,25***	-0,07	-0,08	0,16
Memory	**0,28***	0,11	0	**0,25***	0,19	**0,33***	**0,37****
Cognit.Index	0,08	0,05	-0,03	0,16	0,15	**0,27***	**0,37****
Creative	0,15	0,04	0,01	0,17	-0,02	**0,21***	**0,25***

Source: Researchers themselves. *p<0,05; **p<0,001;

Wechsler et al., 2010). There are different interpretations for the significant correlation between creativity and intelligence found in this study. For Lubart (2007), the presence of creativity without a high level of intelligence precludes the full development of mental elaboration due to the difficulty of maintaining, for long enough, abstract thinking. Another hypothesis is that the relationship between creativity and intelligence may not be linear, but may be related from a moderate level of intelligence (Nakano, 2012).

Despite the apparently better female performance in the psychological test - BAICI, and in the teachers' perception, there was no significant difference between the sexes, corroborating with other studies that affirm whether or not there is a significant difference between them or, when there is, magnitude is low (Chiodi & Wechsler, 2009; Rizza, McIntosh, & McCunn, 2001; Rueda & Castro, 2013; Sayed & Mohamed, 2013). These results confirm the belief that stereotypes about sex skills are unfounded and only make it difficult for women to rise to prominent positions and leadership positions (Mundim, Wechsler, & Primi, 2013). The no gender difference raises still the possibility of the combination of characteristics of both genders, which allows the individual to adapt to any situation without considering cultural values and prejudices. In recent decades, there has been a clear tendency in adolescence towards a more neutral stance, contrary to the defenses of feminist and chauvinist distinctions (Rojas & Franco, 2008).

In comparing cognitive performance between the two populations and the data that show no significant differences in overall scores, it can be seen that certain tests, samples, and / or subtests sometimes favor one sex or the other. Despite the variability in function of the samples under study, differences exist in certain cognitive abilities, and among the most interesting that have aroused, they are verbal, mathematical and spatial skills (Almeida, 1988) which do not coincide with the results found here. In this study, the gender difference was found in the Memory subtest.

There are not so many studies, which relate talents to sex. Those that exist tend to highlight the difficulties faced by talented women by emphasizing the influence of social and cultural forces (Alencar & Virgolim, 2001; Reis, 2005), the disproportional male and female presence, emphasis on eminent creative achievements, and economic and social interests (Stoltzfuz, Nibbelink, Vredenburdg, & Thyrum, 2011). This kind of low representation diminishes opportunities for talent expression despite being distributed across all socioeconomic and ethnic strata without gender specificity (Prado et. al., 2016; Reis & Renzulli, 2009).

As for the question that students with higher vocabulary, good visual memory and creativity in drawing and words were more noticed by teachers, it is worth mentioning that the classroom routine, the number of students per class, their participation and involvement can lead the teacher take care of building routines, standards and rules and failing to understand the individual characteristics of each. The preference for females pointed in this study may be related to the less aggressive and less laborious behavior, usually presented by girls. In turn, students with intellectual abilities such as visuospatial thinking, logical thinking and quick thinking were less perceived. These data draw attention to the urgent need for teacher training so that the most varied types of talents present in the academic context can be perceived and served since society lacks many types of talents and it is up to the school to encourage them (Torrance, 1984). The school also comprises one of the richest contexts for the manifestation of talent (Alencar & Fleith, 2001; Renzulli, 2005).

Given these considerations, suggestions for future studies include teacher training on the most diverse talents present in the school context, especially before their identification process. The limitations of the study refer to the type of school, only private, and may be expanded and the appointment made only by teachers. Future studies may include nominations by classmates, parents, and / or other family members. Among other aspects, it is hoped that this study may have contributed to the perception of the many benefits that the identification, development or expression of talent in the classroom can offer both to the student who has it, as well as to the society in general facing the most diverse

challenges in areas such as economic, technological, social, ethical or moral.

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