

# Evidence of concurrent validity for the use of the Pfister test from children of Ceará

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**Abstract:** The study aims to seek concurrent validity evidence on the use of Pfister Colored Pyramids Test (CPT) in psychological children's evaluation from different developmental levels. 197 children from Fortaleza, Brazil participated, being 54% female, aged 6 to 11 and 6 months ( $M = 8,56$ ,  $SD = 1,47$ ). The ANOVA test was used comparing the CPT performance of three age groups (6-7, 8-9, and 10-11 years old). The incidence of variables related to lower emotional or cognitive development and difficulty in elaborating received stimulation (pure carpet, carpet with onset of order, and affective excitation syndrome) were significantly increased in younger children, while older children had an increase, in the associated indicator to the maturation in treatment of emotions and defensive maneuvers (Layer formation), corresponding to the one expected according to theories of development. The study corroborated to other researches that involved validity evidence to use TPC with children.

**Keywords:** psychological assessment; test validity; color pyramid test; developmental psychology; childhood.

## EVIDÊNCIAS DE VALIDADE CONCORRENTE PARA USO DO PFISTER COM CRIANÇAS DO CEARÁ

**Resumo:** O estudo objetivou buscar evidências de validade concorrente para uso do Teste das Pirâmides Coloridas de Pfister (TPC) em avaliação psicológica de crianças em diferentes fases do desenvolvimento. Participaram 197 crianças de Fortaleza-CE, sendo 54% do sexo feminino, com idades entre 6 anos e 11 anos e 6 meses ( $M = 8,56$ ,  $DP = 1,47$ ). Utilizou-se o teste ANOVA para comparar o desempenho no TPC de três grupos etários (6-7, 8-9 e 10-11 anos). A incidência de variáveis relacionadas a um menor desenvolvimento emocional ou cognitivo e dificuldade para elaborar a estimulação recebida (Tapete puro, Tapete com início de ordem e Síndrome de excitação afetiva) estiveram significativamente aumentadas em crianças mais novas, enquanto crianças com mais idade tiveram aumento no indicador associado ao amadurecimento no trato das emoções e manejos defensivos (Formação em camadas). O estudo corroborou outras pesquisas que envolveram evidências de validade do TPC para uso com crianças.

**Palavras-chave:** avaliação psicológica; validade do teste; teste das pirâmides coloridas; psicologia do desenvolvimento; infância.

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## EVIDENCIA DE VALIDEZ CONCURRENTENTE PARA EL USO DE LA PRUEBA PFISTER CON NIÑOS DEL CEARÁ

**Resumen:** El estudio objetiva buscar evidencias de validez concurrente del Test de las Pirámides Coloridas de Pfister (TPC) en evaluación psicológica con niños con diferentes fases del desarrollo. Participaron 197 niños de Fortaleza-Brasil, ser 54% niñas con edades entre 6 y 11 años y 6 meses ( $M = 8,56$ ,  $DP = 1,47$ ). Test ANOVA fue utilizado para comparar el desempeño de tres grupos de edad (6-7, 8-9, y 10-11 años). La frecuencia de variables relacionadas a menor desarrollo emocional o cognitivo y dificultad de asimilar la estimulación recibida (Alfombra pura, Alfombra con inicio de orden y Síndrome de activación afectiva) fueron mayores en niños más pequeños, mientras que niños mayores tuvieron aumento en lo indicador de desarrollo madurativo en trato con emociones y manejos defensivos (Formación de capas), de acuerdo con las teorías del desarrollo. El estudio corrobora con otros estudios de evidencias de validez para uso del TPC con niños.

**Palabras clave:** evaluación psicológica; validación de test; test de las pirámides coloridas; psicología del desarrollo; infancia.

## Introduction

Development theories contribute to the comprehension of people by establishing characteristics that are typical of each stage of development, so that the behavioral and physical changes that mark the emergence of each stage constitute a coherent pattern. The three main aspects of development studied are physical, cognitive and psychosocial, these being interconnected throughout life (Pereira & Morais, 2016). For this study, aspects related to development from 6 to 11 years of age, that is, the end of the second childhood (3 to 6 years), the third childhood (6 to 11 years) and the period of the beginning of adolescence (11 to 20 years) are highlighted.

In the transition period from the second to third childhood, physical development can be considered constant, egocentric thinking begins to give way to understanding from the perspective of others and there is a progressive increase in mnemonic and language abilities. The self-concept and comprehension of emotions become increasingly complex, independence increases and, even though the family continues to be the focus of the social life, other children become increasingly important. In adolescence, physical changes are rapid and profound, cognitive development is marked by the ability to think abstractly and by the use of scientific reasoning, although immature thinking persists in some behaviors.

There is a consensus among the various theories that childhood is an important developmental period, with it being crucial that the development of children can be accompanied to make a healthy life possible. Child psychological evaluation can be highlighted as a fundamental process to identify aspects that may favor or prejudice the subject during sensitive and critical periods of development (Borsa & Muniz, 2016). Considering that one of the challenges for the evaluation of children is the understanding of the children's language, it is necessary to develop and improve instruments that enable children to express themselves and are, therefore, useful for obtaining important information for the evaluation.

Psychological tests are potential resources for childhood evaluation, therefore, there is a need to legitimize them through scientific rigor as a way to instrumentalize psychologists with reliable tools that fulfill the purpose of the evaluation (Hutz, 2015; Cardoso & Villemor-Amaral, 2017). In order to guarantee this legitimacy, the Federal Council of Psychology (CFP), through Resolution No. 002/2003 (CFP, 2003), decreed some minimum requirements that psychological tests must meet to be considered valid for use, highlighting evidence of validity, standardization and reliability.

The concept of validity of a test is directly related to the level at which the interpretations proposed for the data of the instrument are supported theoretically and through empirical evidence (AERA, APA & NCME, 2014). It should be noted that validity does not refer to the test itself, but to its interpretations according to different contexts and normative groups, which is linked to studies that seek evidence of validity in order to provide scientific meanings for the data originating from a test. Ambiel & Carvalho (2017) discuss the different ways in which evidence of validity can be sought for an instrument, evidencing, for the present study, the concept of concurrent validity, in which relationships must be established between test data and other external variables.

A psychological evaluation technique that has accumulated studies due to both its psychometric qualities and ludic characteristics, favoring its use with children, is the Pfister Colored Pyramids Test (CPT). The CPT is an expressive technique created by the Swiss researcher Max Pfister in 1951, through which information about the cognitive and emotional aspects of the personality dynamics of the evaluated subject can be obtained, being intended for application with people over the age of six years. Since it is simple to perform, it requires a short time and does not depend on verbal expression, which helps the subjects to express themselves in a less inhibited way (Villemor-Amaral, 2012).

The instrument consists of three pyramid schemes, which are filled with colored squares of different colors and tones, according to the preference of the subject. Among the CPT indicators, the final configuration of the pyramids, called the formal aspect, can be cited as one of the fundamental points for the analysis of the test. This aspect shows the level of affective and cognitive development of the evaluated subject since it aims to demonstrate to what degree of complexity the color stimulus was organized (Villemor-Amaral, 2012, 2014). According to Marques (1988 cited by Farah, Cardoso, & Villemor-Amaral, 2014), the formal aspect of the pyramid is directly related to the mental organization of the individual, indicating the capacity for abstraction, discrimination, synthesis and perceptual organization, as well as involving cognitive, organic and emotional aspects of the subject. Thus, it is expected that there will be more common elaborations less organized in children and pre-adolescents and more organized in adolescents and adults (Chagas, 2015; Villemor-Amaral, 2012).

Concerning the colors in the CPT, Villemor-Amaral (2014) emphasized that these can be divided according to the distinctions of the nature of the chromatic stimulus caused by the differences in the lengths and frequencies of the waves of these stimuli.

In this way, the colors can be characterized as hot (red, orange and yellow) or cold (blue, green and violet), the former being considered as corresponding to emotional states of greater excitation when compared to the latter. Furthermore, there are also the so-called achromatic colors (gray, black and white), which may reflect restraint of feelings, inhibitions and denials. In the CPT, clusters of certain colors reveal meanings beyond those represented by their components alone, which characterizes the so-called chromatic syndromes, another indicator that must be highlighted as fundamental for the analysis of the test (Villemor-Amaral, 2012, 2014).

In recent years, there has been an increase in the number of Brazilian studies that have sought to obtain evidence of validity for the use of the CPT with children. In this sense, Villemor-Amaral, Pardini, Tavella, Biasi, and & (2012), Farah, Cardoso & Villemor-Amaral (2014), Villemor-Amaral, Biasi, Cardoso, Pavan, & Tavella (2015) and Cardoso, Bessa, & Targino (in press) conducted studies with children in different regions of Brazil.

The article by Villemor-Amaral et al. (2012) was the first to seek evidence of validity for the use of the CPT with children, highlighting the sensitivity of the test to identify differences in emotional and cognitive development. The sample consisted of 85 children, students from public schools, aged 6 ( $n = 38$ ) and 12 years ( $n = 47$ ), with no history of psychological or psychiatric monitoring and no specific complaints at school. The two groups were compared in terms of color frequency, chromatic syndromes, formal aspect and chromatic formula. The results indicated a lower level of intellectual development in the children aged six years, as well as an increase in extroversion and self-centeredness, with a tendency to project their affections in a timid and insecure way. The children aged 12 years presented signs of insecurity, withdrawal and greater control in the expression of emotions, this being related to the decrease of infantile spontaneity.

Farah, Cardoso, & Villemor-Amaral (2014) performed a study that aimed to find evidence of validity and accuracy for the CPT in children aged 6 to 10 years. To do so, they administered the CPT and House-Tree-Person (HTP) with 200 children from the state of São Paulo. The variables selected for the study were the formal aspect, the color frequency and the color pairing, using the chi-square test, Student's t-test and Pearson's correlation in the data analysis. Initially, a study of concordance among judges was performed, with 88% agreement among the evaluators regarding the formal aspect. There was more incidence of the stuck carpet formal aspect (38%) when compared to the other indicators. Regarding the colors, there was a predominance of red (17%), followed by green (16%) and blue (15%). The study adopted extreme groups according to the HTP as the external variable to the CPT, being composed of 17 children who had few expected indicators and the other by 36 children who had a marked number of indicators. The results indicated that children with less ability to deal with daily emotional demands also presented indications of acting with repression or abrupt discharge of emotions.

Villemor-Amaral et al. (2015) studied the influence of aspects related to gender and age on the color choice in the CPT. The study consisted of 734 records of subjects

from São Paulo and Minas Gerais, of which 206 were from adults, aged between 19 and 78 years (57% male) and 528 from children, aged 6 to 12 years (41% male). Data were analyzed using Student's t-test, comparing the use of the different tones of blue and red colors according to sex, and later, according to age group. Regarding the comparison between adult women and girls, it was possible to detect a greater tendency for the girls to use darker tones of blue and red colors, which may be associated with a greater need for repression of the emotions, representing a phase characterized by little maturation. In the comparison between the performance of adult males and boys, the significant use by the boys of red, associated with the lighter tone, stood out. The authors discussed the cultural character of the choice of colors, insofar as their representativeness is directly related to socially constructed patterns. In this sense, the study highlighted the predominant choice of lighter shades by women and children, which suggest more fragility, while the use of darker or vibrant colors, which may denote strength or energy, was more frequent in the men.

Cardoso, Bessa, & Targino (in press) looked for possible influences in the chromatic choices from the differences between the sexes. The study used a sample of 197 children, aged 6 years to 11 years and 6 months (mean = 8.56, SD = 1.47), living in Fortaleza, in the state of Ceará, of which 91 (46%) were male and 106 (54%) female. The analysis was performed by means of the comparison of the formal aspect indicators, execution process, the frequency of use of the colors and chromatic syndromes, with Student's t-test being used for this. The results indicated greater use of the colors blue 3, red 2, green 3 and black by the boys, while the girls made more frequent use of the colors red 1, violet 1 and violet. Regarding the chromatic formula, the boys presented a greater incidence of broad and flexible formulas, when compared to the girls, as well as a disorderly execution process. These data suggest that characteristics related to a possible distancing from very stimulating situations may be associated with boys, while the indicators that stood out in the girls of this sample indicate more impulsive attitudes and possible aspects associated with structural fragility.

The studies cited favor the use of the CPT with children between 6 and 11 years of age in different Brazilian states. Given the importance of the specificities inherent to the childhood development process, as well as the constant study of evidence of validity of psychological evaluation instruments, the present study aimed to find evidence of concurrent validity for the Pfister Colored Pyramids Test (CPT) for use in the evaluation of children from Ceará, considering, for this, different age groups as the comparison criterion.

## Method

### Participants

The present study was carried out with a sample of 197 students from public and private schools of the city of Fortaleza, Ceará, 106 (54%) female and 91 (46%) male, with ages varying between 6 years and 11 years and 6 months (mean = 8.56, SD = 1.47).

The sample was organized into three groups according to age: 54 (27.4%) children aged 6 to 7 years, 78 (39.6%) with ages between 8 and 9 years and 65 (33.0%) aged between 10 and 11 years. During the sample composition process, inclusion criteria were established in order to minimize possible influences on the uniformity of the data, highlighting the need for the child not to present a history of psychological or psychiatric treatment, to be attending the grade corresponding to their age group and to present medium or high performance in the Raven's Colored Progressive Matrix Test, which was used as a measure for the control of possible intervening variables related to the cognitive process of the subjects. In addition, the children needed to have the consent form signed by those responsible, as well as agree to take part in the study by registering in the Terms of Assent.

## Instruments

### *Pfister Colored Pyramids Tests – CPT Version for Children and Adolescents (Villemor-Amaral, 2014)*

It is a self-expressive method that aims to evaluate aspects of the personality, highlighting the affective dynamics and cognitive functioning of the individual. The test has had a favorable opinion for use in the Psychological Testing Assessment System (SATEPSI) since 2005 (CFP, 2017) and psychometric studies with samples of Brazilian children and adolescents have been performed. As far as reliability is concerned, studies of consistency between evaluators have been carried out on the variables that have some degree of subjectivity in the codification, that is, those of the formal aspect and chromatic formula. Villemor-Amaral (2012) obtained 86% concordance for the formal aspect and 92.4% concordance for the chromatic formula. Farah, Cardoso, & Villemor-Amaral (2014) obtained 88% concordance for the coding of the formal aspect, with no analyses related to the chromatic formula performed. In addition, all the studies cited by Villemor-Amaral (2014) obtained moderate or excellent correlations from the Kappa coefficient for the formal aspect and chromatic formula.

For the standardization study of the CPT, the sample was composed of students from 11 schools of the states of Minas Gerais and São Paulo, six public and five private. In all, 528 children participated in the study, 309 female and 219 male, ranging in age from 6 to 12 years. The studies developed over the years have presented important results regarding the evidence of validity for the CPT with children, as already mentioned in the introduction.

### *Raven's Colored Progressive Matrices Tests (Angelini, Alves, Custódio, Duarte, & Duarte, 1999)*

Known in Brazil as the "Special Scale", Raven's Colored Progressive Matrix test is a non-verbal intelligence test that evaluates the general factor "g" proposed by Spearman. It is intended for children aged 5 years to 11 years and 6 months, older adults and people with some level of intellectual impairment. The instrument is composed of

three sets (A, Ab and B), each with twelve items distributed in increasing order of difficulty. Each item consists of an image or matrix where a part is missing, with the subject choosing, among the six options, the one that correctly completes the item. The application can be performed individually or collectively.

Psychometric studies with Brazilian samples have been carried out and the test has a favorable evaluation in the SATEPSI (CFP, 2017). The results of the studies have shown a progressive increase in performance according to age, evidencing the validity through the chronological age criterion (Angelini et al., 1999). In addition, the Spearman-Brown halves method was used to obtain the correlation between the even and odd items for each sex, in each age group and for the total sample. The corrected coefficients were 0.92 for males, 0.90 for females and 0.92 for the total sample. Additionally, in the internal consistency analysis, the majority of the items presented item-total correlations ranging from 0.3 to 0.8.

## Procedures

The data collection was carried out by undergraduates of the Psychology course of a public university in Ceará, all of the members of a laboratory of psychological evaluation studies that operates in the educational institution. The students underwent weekly training for six months, totaling 96 hours. The training was organized by the research coordinator and enabled the students to become familiar with the instruments and to be able to use them according to the application and coding standards.

The laboratory members contacted public and private schools in Fortaleza, seeking to establish partnerships to facilitate the composition of the sample. Subsequently, the research project was submitted and approved by the Research Ethics Committee, under CAAE n. 26205614.1.0000.5534. After approval, the contacts with the schools were resumed and contact was made with those responsible for the children, who signed a consent term. Each participant in the sample agreed to take part in the study through the Terms of Assent.

The Raven test and the CPT were applied, in this order, with all the children of the sample. The instruments were administered in an individual session with an average duration of 60 minutes.

All the instrument records of the participants that fulfilled the inclusion criteria for the sample and did not meet the exclusion criteria were coded by the examiner. All the coded records were reviewed by a researcher of the laboratory team who was not the applicator of that record and had the codification conferred by the research coordinator.

## Results

First, the reliability of the coded variables was verified through the Kappa index, which makes it possible to check the consistency among the evaluators. To perform the Kappa, 25% of the protocols were randomly selected, and these were analyzed



by a second blind evaluator. The results indicated good reliability of the data analyzed [formal aspect of pyramid I (Kappa of 0.93,  $p < 0.001$ ), of pyramid II (Kappa of 0.86,  $p < 0.001$ ) and of pyramid III (Kappa of 0.88,  $p < 0.001$ ) and chromatic formula (Kappa 0.92,  $p < 0.001$ )].

After checking the reliability among the evaluators, the data were transferred to the SPSS program. Then, the three different age groups were compared through ANOVA, using Tukey's post hoc test to identify which groups presented differences between them. The CPT variables compared between the groups were the formal aspect, chromatic formula, color frequency and chromatic syndromes. The statistical analysis showed differences considered significant in each age group. Table 1 shows the formal aspects that presented statistically significant differences.

**Table 1. Variables of the Formal aspect of the CPT that presented significant differences.**

Variable	Group	N	Mean	Standard Deviation	F	P
Pure carpet	6 to 7 years	54	0.57	0.74	5.729	0.004
	8 to 9 years	78	0.33	0.59		
	10 to 11 years	65	0.20	0.47		
Stuck carpet	6 to 7 years	54	1.14	0.99	4.352	0.014
	8 to 9 years	78	1.6	1.12		
	10 to 11 years	65	1.12	1.12		
Carpet with starting order	6 to 7 years	54	0.77	0.9	4.307	0.015
	8 to 9 years	78	0.39	0.63		
	10 to 11 years	65	0.53	0.68		
Layer formation	6 to 7 years	54	0.05	0.23	4.383	0.014
	8 to 9 years	78	0.15	0.45		
	10 to 11 years	65	0.33	0.75		

Source: The authors.

Tukey's test indicated that the significant difference in the pure carpet and layer formation variables occurred between the 6-7 years and 10-11 years groups and that the carpet with starting order variable presented a difference between the of 6-7 years and 8-9 years groups. The stuck carpet variable presented a marginally significant difference between the 6-7 years and 8-9 years groups and a significant difference between the 8-9 years and 10-11 years groups.



**Table 2. Color variables and chromatic syndrome of the CPT that presented significant differences.**

Variable	Group	N	Mean	Standard Deviation	F	P
R1	6 to 7 years	54	3.51	3.28	3.251	0.041
	8 to 9 years	78	2.43	1.66		
	10 to 11 years	65	2.61	2.56		
B2	6 to 7 years	54	1.17	1.11	3.606	0.029
	8 to 9 years	78	0.69	0.74		
	10 to 11 years	65	0.86	1.15		
W	6 to 7 years	54	2.48	2.18	3.215	0.042
	8 to 9 years	78	3.74	3.17		
	10 to 11 years	65	3.41	2.94		
G	6 to 7 years	54	1.79	1.25	2.991	0.053
	8 to 9 years	78	1.95	1.52		
	10 to 11 years	65	1.39	1.23		
Colorless syndrome	6 to 7 years	54	6.17	2.93	3.225	0.042
	8 to 9 years	78	8.1	4.78		
	10 to 11 years	65	7.45	4.68		
Affective arousal syndrome	6 to 7 years	54	0.91	0.29	3.378	0.036
	8 to 9 years	78	0.82	0.36		
	10 to 11 years	65	0.72	0.43		

Source: The authors.

Table 2 shows the variables that had significant differences through ANOVA. Tukey's test showed that the colors Red 1 (R1), Brown 2 (B2) and the affective arousal syndrome presented a significant increase in the 6-7 years age group. In the 8-9 years age group, the increase in the White (W) and Gray (G) colors and the colorless syndrome was considered significant. Next, Pearson's correlation was performed between the ages of the children and the frequency of each color. Positive correlations with White ( $r = 0.164$ ,  $p = 0.021$ ) and with Yellow 1 ( $r = 0.147$ ,  $p = 0.040$ ) and negative correlations with Gray ( $r = -0.138$ ,  $p = 0.054$ ) and with B2 ( $r = -0.155$ ,  $p = 0.029$ ) were observed. All correlations were weak.

## Discussion

The incidence of the pure carpet and carpet with starting order variables was significantly higher in the 6-7 years age group, as shown in Table 1. Similar results were

obtained in a study by Villemor-Amaral (2014), which verified an increase in the frequency of the pure carpet and carpet with starting order variables in children aged 6 years. The carpet type configuration points to a lower degree of emotional or intellectual development, the pure carpet being suggestive of adaptation to the situation, while the carpet with starting order reflects a form of transition seeking emotional balance and is indicative of greater potential for organization, although this has not yet stabilized (Villemor-Amaral, 2012, 2014).

The stuck carpet was more frequent in the 8-9 years age group. This formal aspect is related to dissociation in the course of thought, suggesting difficulties related to the way in which thought flows. Villemor-Amaral (2014) pointed out that this variable has shown a relatively high incidence in children and in adults considered non-psychiatric patients, similarly observed in the studies of Farah, Cardoso, & Villemor-Amaral (2014) and Chagas (2015).

The formal aspect related to layer formation was significantly higher in the 10-11 years age group. Layer formations are intermediary organizations that suggest a maturation process in dealing with defensive emotions and maneuvers, indicating a personality that is still in formation, not stabilized and vulnerable (Villemor-Amaral, 2012). The aspects referred to above are in accordance with characteristics expected in children approaching adolescence since they represent a more structured emotional organization process than the carpets, however, have not yet reached the level of maturity represented by the structures in the CPT (Villemor-Amaral, 2014). These data show accordance with the study developed by Chagas (2015), in which the formations were also observed more frequently in adolescents.

Table 2 presents the variables related to color frequency and chromatic syndromes that showed differences between the groups. The children aged 6-7 years presented a significant increase in the Red 1 and Brown 2 colors. The use of Red reflects more excited states of extroversion, irritability and impulsivity, as well as the use of Brown which, in addition, reflects energy, action and dynamism. According to Villemor-Amaral et al. (2012), the impulsivity represented by the incidence of Red, coupled with the connotation of more primitive relationships of Brown, may reflect abrupt discharges and regression.

It can be assumed that the increase in tones, associated with agitation, movement and action, is related to the physical changes of this stage of development since it is a period characterized by the great evolution of the general and refined motor skills of the children. This amplitude and motor refinement contribute to the discovery of the world and socialization, directly influencing the way children deal with their emotions, corroborating the comprehension of the increase in the affective arousal syndrome in this age group.

The affective arousal syndrome is composed of the combination of the colors Orange, Violet and Green and, according to Villemor-Amaral (2012), is frequent in egocentric or anxious individuals, who cannot elaborate the stimulations received.

The increase in this variable in this age group may be related to egocentric characteristics and difficulty in thinking and acting empathically, insofar as the children are so focused on their own point of view that they believe that everyone thinks, feels and perceives the world the same as them, as noted by Peralta & Oliveira (2017).

There was also a higher incidence of the White and Gray colors in the 8-9 years group. White is associated with structural fragility, precarious stability, vulnerability and lack of control mechanisms. Gray relates to affective deprivation, feeling of emptiness, anxiety, insecurity, repression of affections, caution, and restriction of emotional contacts (Villemor-Amaral, 2012). It was also noted that these two colors had a correlation with age, favoring the association of the interpretations made. As a consequence of the increased use of these colors, the colorless syndrome also showed an increase in this grouping. According to Villemor-Amaral (2012), the colorless syndrome is formed by the frequency of the colors Black, White and Gray and is related to the function of denying, attenuating or repressing stimuli and to running away from affective or stimulating situations.

According to Villemor-Amaral (2014) the increase in the frequency of use of the Black and White colors, as well as the colorless syndrome, is generally observed in children older than 11 to 12 years. In the study by Villemor-Amaral et al. (2012), there was an increase in the White and Black colors in older children, as well as a higher frequency of the colorless syndrome. The increase of these tones in older children is related to the period of puberty, marked by physical and psychic changes.

Interestingly, in the middle 8-9 years age group, there was an increase in variables related to the inability to express emotions and psychic suffering. Psychosocial development involves emotional development and development of the self-concept, being affected not only by family structure and friendships but also by the social reality experienced at school (Peralta & Oliveira, 2017). These are factors that act directly on the child's management of emotions and, consequently, the personality and formation. These data need to be further investigated, with the need for more studies to be developed in order to verify the increase in the frequency of indicators related to emotional difficulties in this age group.

Given the above, the results of the CPT application with children from Ceará analyzed in the light of developmental theories, show concordance among the increased variables in each age group, which, for the human development literature, is expected in the periods investigated. The study also corroborates the studies of Villemor-Amaral et al. (2012), Farah, Cardoso, & Villemor-Amaral (2014), Chagas (2015), Villemor-Amaral et al. (2015) and Cardoso, Bessa, & Targino (in press), insofar as it adds to them in relation to the evidence of validity of the test for use with children, supporting the possibility of using the CPT with children, which should potentially contribute for the realization of adequate psychological assessments for children, as defended by Borsa & Muniz (2016).

The present study was carried out with a limited number of children and was restricted to the capital of Ceará, with no data from other municipalities of the state.

Therefore, it would be interesting to increase the sample size and involve children from other municipalities. Finally, it is believed that this study contributes to the development of evidence of validity for the use of the CPT, allowing the responsible use of the instrument based on scientific criteria described by Cardoso & Villemor-Amaral (2017), Hutz (2015) and Ambiel & Carvalho (2017).

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