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21st century skills: relationship between creativity and socioemotional skills in Brazilian students[1]

Habilidades do século XXI: relações entre criatividade e competências socioemocionais em estudantes brasileiros

Tatiana de Cassia Nakano[*]
Ricardo Primi[**]
Rauni Jandé Roama Alves[***]

ABSTRACT

A series of skills are more and more valued in the educational context than cognitive ones. The constructs of creativity and socio-emotional competencies are some of them and were the focus of the study. The aim was to investigate the relationship between both constructs in 362 students from the 3rd (n = 168) and 5th year (n = 194) of Elementary School. That sample was composed of 8 and 15-year-old students (M = 10.3; SD = 1.33) and 180 female, from 13 different municipal public schools in Pernambuco, Brazil. The students answered two creativity tests (figural and verbal) and another that assesses six socio-emotional competencies (openness

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[*] Pontifícia Universidade Católica de Campinas. Programa de Pós-Graduação em Psicologia. Campinas, São Paulo, Brasil. E-mail: tatiananakano@hotmail.com - https://orcid.org/0000-0002-5720-8940

[**] Universidade São Francisco. Programa de Pós-Graduação em Psicologia. Campinas, São Paulo, Brasil. E-mail: rprimi@mac.com - https://orcid.org/0000-0003-4227-6745

[***] Universidade Federal de Rondonópolis. Rondonópolis, Mato Grosso, Brasil. E-mail: rauniroama@gmail.com - https://orcid.org/0000-0002-1982-1488

to experiences, conscientiousness, extraversion, agreeableness, external locus of control, and neuroticism). The results indicated significant and positive correlations between figural creativity and three socio-emotional competencies (conscientiousness, agreeableness, openness to experiences, and locus of control) and between verbal creativity and two socio-emotional dimensions (conscientiousness and agreeableness). Although constructs have shown some commonality, the importance of stimulating both in the educational context is relevant, given the positive results related to these skills, considered essential in the 21st century.

Keywords: Personality. Big five model. Social skills. Emotional skills. Psychological assessment.

RESUMO

No contexto educacional, cada vez mais, uma série de habilidades, além das cognitivas, vêm sendo valorizadas. Dentre elas, os construtos de criatividade e competências socioemocionais, foco do estudo. Tendo como objetivo investigar a relação entre os dois construtos, a amostra foi composta por 362 estudantes do 3º (n = 168) e 5º ano (n = 194) do Ensino Fundamental, idades entre 8 e 15 anos (M = 10,3 anos; DP = 1,33), sendo 180 do gênero feminino, provenientes de 13 diferentes escolas públicas municipais localizadas no estado de Pernambuco, Brasil. Os estudantes responderam dois testes de criatividade (figural e verbal) e um instrumento que avalia seis competências socioemocionais (abertura a novas experiências, conscienciosidade, extroversão, amabilidade, lócus de controle externo e neuroticismo). Os resultados apontaram para a existência de correlações positivas significativas entre a criatividade figural e quatro das competências socioemocionais (conscienciosidade, amabilidade, abertura a experiências e locus de controle externo) e da criatividade verbal com duas dimensões socioemocionais (conscienciosidade e amabilidade). Ainda que os construtos tenham apresentado alguma comunalidade, a importância de se estimular ambos no contexto educacional se faz presente, dados os resultados positivos que têm sido relacionados a essas habilidades, consideradas essenciais no século XXI.

Palavras-chave: Personalidade. Cinco grandes fatores. Habilidades sociais. Habilidades emocionais. Avaliação psicológica.

Introduction

Children and young adults' education in the 21st century should focus developing skills necessary for academic, professional and personal success. Creativity and socioemotional skills are critical skills, assuming an essential role in school curricula in several countries (HECKMAN; STIXRUD; URSUA, 2006). These skills are considered essential to achieve holistic and healthy functioning, leading to complete development and personal and professional fulfillment. Significant institutions such as World Bank and Organization for Economic Cooperation and Development (OECD) have been fostering the promotion of these skills at governments and policy-making levels internationally (CLERKIN, 2018), considering that both abilities can act as factors that driver the healthy development.

Creativity is highlighted as an essential 21st-century skill (KUPERS *et al.* 2019). It is perceived as an asset for economies wanting a differential accomplishment in professional, social, academic, and personal life. In this sense, creativity development is a hot topic for educators, policy makers and researchers (KAUFMAN, LURIA; BEGHETTO, 2018; ZHU *et al*., 2019).

Creativity is defined as the interaction between an individual's ability, process, and environment in creating a product that is perceived as new and useful within a social context (PLUCKER; BEGHETTO, 2004). It is a multidimensional construct resulting from an interaction between cognitive skills, emotional aspects, personality characteristics, and environmental elements (WECHSLER, 2018). So, researchers have highlighted this construct as a positive and relevant feature for human development and essential for mental health (CHARYTON *et al*., 2009; OLIVEIRA; NAKANO; WECHSLER, 2016; WECHSLER; NAKANO, 2018). Consequently, the development of creativity must be encouraged as a vital capacity to face current problems and future challenges (LASSIG, 2019; ZHAO; GERAIN, 2016).

Literature highlights various benefits of fostering creativity. In organizations, it helps to thrive in modern, complex, and competitive environments. It can promote positive moods and facilitate coping negative experiences (YAHN; KAUFMAN, 2016). Governments can help increase prosperity and economic development by discoveries in the arts, science, technology. It also can help improve the well-being of its citizens (GRIGORENKO, 2019).

Socioemotional characteristics are also associated with satisfaction in interpersonal relationships, positive development of children and adolescents, such as adjustment and adaptation to the environment, preventing learning

problems and academic failure, emotional self-regulation, and positive social interaction (ATANNAZIO *et al*., 2020; CUI *et al*., 2018; LIPNEVICH; ROBERTS, 2012). Other benefices include impulse control, motivation, persistence, cooperation with others (LECHNER; ANGER; RAMMSTEDT, 2019), prevention of learning problems and academic failure, increased frequency, and additional hours of study (DELANEY; HARMON; RYAN, 2013). Early childhood has been highlighted as a sensitive period for developing socioemotional skills (LECHNER; ANGER; RAMMSTEDT, 2019).

A group of scholars has proposed to understand socioemotional characteristics using the taxonomy of the Big Five Personality Factors model. This model includes five broad categories: (1) open-mindedness (associated skills of curiosity, imagination, broad interests, and search for questions), (2) agreeableness (tendency to act cooperatively, including depth and closeness in interpersonal relationships), (3) conscientiousness (tendency to the organization, self-discipline, and persistence, responsibility; task focus on learning), (4) extraversion (orientation of interests and engagement towards the outside world) and (5) emotional stability (ability to regulate and not to be overwhelmed by negative affect's such as sadness, anxiety, and anger) (ABRAHAMS *et al.,* 2019; KRAUZ *et al.,* 2015; PRIMI *et al*. , 2019; SANTOS; PRIMI, 2014).

Despite the importance of creativity and socio-emotional skills, their relationship among young students in school settings is less frequently studied. One more common field of research in creativity tries to identify adult's creative personality, whether the personality of recognized creative adults differs from others adults from the general population (MUSSEL *et al.*, 2015). The studies also seek to analyze how each of the five personality factors relates to creativity (CHÁVEZ-EAKLE; EAKLE; CRUZ FUENTES*,* 2012; CHRISTENSEN; DREWSEN; MAALOE, 2014).

Studies of Big Five Personality factors and creativity in adults show that open-mindedness is associated with creativity (BATEY; CHAMORRO-PREMUZIC; FURNHAM, 2010; CHENG; KIM; HULL, 2010; CONNER; SILVIA, 2015; GEORGE; ZHOU, 2001; HOSEINIFAR *et al.,* 2011; MA, 2009; PURYEAR; KETTLER; RINNI, 2017; SILVIA; MARTIN; NUSBAUM, 2009; SUN; CHOI, 2009; VON STUMM; CHUNG; FURNHAM, 2011; ZARE; FLINCHBAUGH, 2018). Studies of emotions and creativity in adults show that positive emotional state would favor creativity, and negative states (low emotional regulation) would act as an inhibiting element (ZENASNI; LUBART, 2008).

The present study seeks to investigate the relationship between creativity and socioemotional skills in young students. It aims to assess creativity potential in two domains (in figural drawings and verbal metaphor productions) to test the

associations of two different expressions of creativity and six socio-emotional skills specifically purposed to measure personal characteristics in young students.

Method

Participants

The sample comprised 362 elementary school students attending 3rd (n = 168) and 5th (n = 194) grades, from 13 different public schools located in Pernambuco, Brazil. The participants were aged between 8 and 15-year-old (M = 10.3; SD = 1.33), and 180 were female (five did not answer this question). Convenience criteria selected the sample and the students had been took part of another research, and the database was used in the present research.

Instruments

To measure the constructs, the researchers opted for the use of tests to evaluate the target constructs. Thus, they started with the possibility of using instruments that showed psychometric qualities evidenced for the purpose for which they were developed. The results were aimed at helping to understand the creative potential and personality traits presented by the sample.

We assessed creativity using two subtests of the Giftedness Assessment Battery (NAKANO; PRIMI, 2015), which focused on verbal and figural creativity. Global psychometric properties of these tests were reported in previous studies (NAKANO *et al.,* 2015a, 2020; NAKANO *et al.*, 2017; NAKANO *et al*., 2020b; NAKANO; PRIMI, 2020; NAKANO *et al.*, 2016; NAKANO *et al.*, 2015b; RIBEIRO; NAKANO; PRIMI, 2014).

Completing Figures Test (CFT)

CFT is a divergent thinking task that asks students to complete ten incomplete figural stimuli. Creativity is assessed by eleven characteristics/ creative indicators: Fluency, Flexibility, Elaboration, Originality, Expression of Emotion, Fantasy, Movement, Uncommon Perspective, Internal Perspective, Use of Context, and Expressive Titles. These indicators are scored and organized into three factors: Elaboration, Emotional and Cognitive.

Metaphor Creation Test (MCT)

MCT is a verbal divergent thinking task that asks students to complete sentences to write a metaphor such as "The camel is the _____ of the desert" ("motorcycle," "boat"). For each sentence, MCT asks up to four answers and an explanation of the relationship provided. MCT assesses verbal creativity by asking raters to score the quality of the metaphor into 0 (not a metaphor), 1 (a simple metaphor), 2 (a metaphor with the remote association), and 3 (a metaphor with the very remote association). Raters also score Flexibility by counting how many different response categories for the same sentence (varying 1 to 4).

SENNA v1.0 inventory

SENNA (PRIMI *et al*., 2019) is a self-report questionnaire composed of 92 statements about personal socioemotional characteristics organized into six factors/scales: open-mindedness (F5.Opns), agreeableness (F4.Agre), conscientiousness (F1.Cons), extraversion (F2.Extr), emotional stability (F3. Neur), and external locus of control beliefs (F6.ELoc). Students are asked to answer on a scale of similarity to the self from 1 (nothing like me) to 5 (totally like me). Scale scores are calculated as average endorsements of scale items resenting in a metric of 1 to 5. They are all positive scores (more agreeable, conscientiousness, extraversion and more emotional stability). The exception occurs in the locus of control scale that means external beliefs ("*Do you usually feel that it's almost useless to try in school because most other children are just plain smarter than you are?*") and internal beliefs ("*Most of the time, do you feel that you can change what might happen tomorrow by what you do today?*"). A series of studies has already investigated its psychometric qualities (PANCORBO; LAROS, 2017; PRIMI *et al.,* 2019c; PRIMI, *et al*., 2016a; PRIMI *et al*., 2016b).

Procedures and data analysis

Initially, the research was approved by the Research Ethics Committee (CAAE: 48871215.5.0000.54781). Data collection was performed in a single session, with an estimated one hour and forty minutes, coordinated by a psychologist and other trained researchers. The participants responded to the

creativity tests (given the need to control the execution time) and then to the socioemotional instrument.

Raters scored 11 indicators of the *CFT* figural test. Then three factors scores were calculated. Twelve raters scored MCT responses. At least two raters scored each answer, and the final score was the average of scores of all productions. Raters were graduated students previously trained in scoring rubrics for these two tests. See previous studies for psychometric properties of MCT test: David *et al.* (2014), Dias, Couto and Primi (2009), Primi, Miguel, Couto and Muniz (2007) that compose a given factor. Before calculating scores, we reversed the negatively keyed items.

We calculated the correlation coefficients between creativity and socioemotional characteristics testing whether coefficients were significantly different from zero.

Results

Table 1 shows the descriptive statistics and correlations for all variables. On CFT, cognitive factor (Fluency, Flexibility, and Originality) had a higher score than other factors. Emotional factor (Expression of Emotion, Movement, and Expressive Title) had the lowest mean. This result has been noticed in previous research and has been interpreted as low creative performance in emotional characteristics (NAKANO, WECHSLER; PRIMI, 2012; RIBEIRO; NAKANO; PRIMI, 2014; WECHSLER, 2004a, 2004b). SENNA scores have a metric of 1 to 5 and were all around 3.5 except locus of control that is reversed and had a lower average (M = 2.9). The results are presented in Table 1.

TABLE 1 – MEANS, STANDARD DEVIATIONS, AND CORRELATIONS WITH CONFIDENCE INTERVALS

Variable	*M*	*DP*	1	2	3	4	5	6	**7**	8	9	10	11	12
1. cft_elb	10.0	8.0												
2. cft_emo	0.74	1.4	.41**											
3. cft_cog	15.9	8.5	.61**	.21**										
4. TCFtotal	27.5	15.3	.90**	.42**	.89**									
5. mct_qual	2.43	3.9	.22**	.17*	.20*	.26**								
6. mct_flex	0.31	0.3	.16*	.10	.19*	.20**	.72**							
7. TCMtotal	2.7	4.2	.22**	.17*	.21**	.26**	1,00**	.76**						
8. F1. Cons	3.5	0.61	.11	.07	.14*	.14*	.29**	.26**	0,30**					
9. F2. Extr	3.2	0.50	.00	.11	.15*	.09	.13	.09	0,13	.38**				
10. F3. Neur	3.1	0.62	-.06	.00	-.01	-.04	.06	.08	0,07	.43**	.04			
11. F4. Agre	3.4	0.66	.18**	.09	.21**	.23**	.21*	.11	0,21*	.60**	.48**	.20**		
12. F5. Opns	3.4	0.82	.19**	.10	.17*	.21**	.13	.03	0,13	.47**	.54**	.01	.69**	
13. F6. ELoc	2.9	0.75	.15*	.09	.07	.13*	-.15	-.23*	-0,16	-.03	.31**	-.41**	.32**	.56**

Legend: CFT = Completing Figures Test; MCT = Metaphor Creation Test; Cons = Conscientiouness; Extr = Extroversion; Neur = Emotional Stability; Agre = Agreeableness; Opns = Open Mindedness; ELoc = External Locus of Control; * indicates $p < .05$. ** indicates $p < .01$.
Note: M and *SD* are used to represent mean and standard deviation, respectively.
SOURCE: author's elaboration.

The shaded part of Table 1 shows Pearson's correlations of creativity and socioemotional skills. Figural creativity total was positively correlated with four factors: agreeableness, open mindedness, conscientiousness and external locus of control. The effect size was small (.13 to .23). Conscientiousness and Extroversion were also positively correlated with the cognitive factor. Agreeableness and Open-Mindedness presented positive correlations with cognitive and elaboration factors. Locus of control only showed significant correlations with Elaboration factor. Neuroticism was not related to any figural creativity measure.

Verbal creativity total was positively correlated with conscientiousness and agreeableness with small to moderate magnitude (.21 to .30). The metaphor quality measure was positively correlated to conscientiousness and agreeableness and flexibility with conscientiousness and negatively with external locus of control.

Discussion

We found that creativity was positively and significantly related to socioemotional skills, namely: agreeableness, conscientiousness, open-mindedness, and locus of control. Also, figural creativity is associated with all these skills, and verbal creativity (metaphor production) was strongly associated with conscientiousness.

Agreeableness is interpreted as a tendency to act cooperatively, and have empathy and depth and closeness in interpersonal relationships (SANTOS; PRIMI, 2014) is listed as a characteristic of creative personality. A series of research on the subject reported results confirming the relationship between creativity and agreeableness (BATEY; FURNHAM, 2006; CHÁVEZ-EAKLE; EAKLE; CRUZ-FUENTES, 2012; CHRISTENSEN; DREWSEN; MAALOE, 2014; HUGHES; FURNHAM; BATEY, 2013; HSU; HOA; FAN, 2011; SILVIA *et al.*, 2011; VON STUM; CHUNG; FURNHAM, 2011). Also, creative products are related to a people's collective effort and not produced by isolated individuals. We can also mention that agreeableness is related to school achievement. This result is probably related to agreeable students being willing to do the tasks asked by the teachers and researchers.

Open-mindedness is associated with curiosity, imagination, broad interests, and wealth of ideas, particularly in new situations. Open students have increased chances to retrieve remote ideas and associations, resulting in creative thinking

(BATEY; CHAMORRO-PREMUZIC; FURNHAM, 2010). Creative people tend to be open to the unknown world, both outside and inside, tend to be more imaginative, seek external stimulation. They also be spontaneous and uninhibited expressing ideas and emotions without being afraid of error and welcome new information even when they are complex (FEIST, 1998; WECHSLER, 2018). Openness is the number one Big Five factor associated to creativity (BATEY; CHAMORRO-PREMUZIC; FURNHAM, 2010; BATEY; FURNHAM, 2006; BATEY, FURNHAM; SAFFIULINA, 2010; CHANG *et al*., 2015; CHEN, 2016; CHENG; KIM; HULL, 2010; CONNER; SILVIA, 2015; DOLINGER; URBAN; JAMEZ, 2004; FEIST, 1998; HOSEINIFAR *et al.,* 2011; HUGHES *et al..,* 2013; IVCEVIC; MAYER, 2007; KING; WALKER; BROYLES, 1996; LUBART, 2007; MA, 2009; MARTINSEN, 2011; MCCRAE, 1993; NELSON; RAWLINGS, 2010; PRABHU; SUTTON; SAUSER, 2008; PURYEAR; KETTLER; RINNI, 2017; SILVIA *et al*., 2009, 2014; SUN; CHOI, 2009; TEHRAN; KHALEDI, 2014; VON STUMM *et al*., 2011; WOLFRADT; PRETZ, 2001; ZARE; FLINCHBAUGH, 2018).

Conscientiousness describes a tendency to be organized, hardworking, responsible, disciplined, persistent, and task-oriented from organized goals (SANTOS; PRIMI, 2014). Such skills are essential for the long-term creative process, especially the development of final products, as they are usually the result of many failed attempts, effort, and dedication. This factor is composed of skills related to self-discipline, goal setting, and persistence (PURYERAR *et al*., 2017). Ivcevic and Nusbaum (2017) propose two abilities related to the implementation phase of creative process. The person "select promising ideas and develop ideas into products and services" (IVCEVIC; NUSBAUM, 2017, p. 343) described as: "(1) revising and re-strategizing on the way from the creative idea to a completed product; and (2) sustaining and maintaining effort in the face of obstacles and discouragement" (IVCEVIC; NUSBAUM, 2017, p. 346). These are explicit attributes of the conscientiousness domain on the Big Five Model.

The literature shows that the relationship between conscientiousness and creativity is not stable (REITER-PALMON; ILLIES; KOBE-CROSS, 2009). Sometimes a positive relationship is described (CHANG *et al*., 2015; CHEN, 2016; HOSEINIFAR *et al*., 2011; PURYEAR; KETTLER; RINNI, 2017; SILVIA *et al*., 2014; XU *et al*., 2018; ZARE; FLINCHBAUGH, 2018), but also an absence of relationship (CHAMORRO-PREMUZIC, 2006; FURNHAM; BATCHIAR, 2008; GEORGE; ZHOU, 2001; KELLY, 2006; TEHRAN; KHALEDI, 2014) or even negative correlation (FURNHAM; ZHANG; CHAMORRO-PREMIZIC, 2006; ROBERT; CHEUNG, 2010; WOLFRADT; PRETZ, 2001). One possible explanation of absence or a negative relationship between conscientiousness and creativity is based on the idea that high conscientiousness individuals have

difficulty breaking rules and acting impulsively. There are typical characteristic of a creative individual. Such behaviors can decrease the chances of being unconventional and finding original ideas (BATEY; CHAMORRO-PREMUZIC; FURNHAM, 2010).

The absence of correlation with extroversion was an unexpected result because several studies have shown that more outgoing people are more creative (BATEY; CHAMORRO-PREMUZIC; FURNHAM, 2010; FURNHAM; BACHTIAR, 2008; NAKANO; CASTRO, 2013; GONÇALVES; SCHELINI; DEFFENDI, 2016; ZHANG; ZHOU; KWAN, 2017), because they are more confident in their skills (CHIANG; HSU; SHIH, 2017). One possible reason is that the domain of creativity assessed by metaphor and drawing production was more close to an academic task and not personal expression that would be more related to extroversion.

We found the most expected association of socioemotional skills and creativity (figural and verbal) demonstrated in adults study. However, caution is recommended to interpret the results considering certain limitations presented on this study, such as the number of participants, the instruments selected to measure each of the constructs, and the investigation of a single Brazilian state. Future studies involving other instruments for assessing socioemotional competences, and assessing other aspects of creativity in addition to their verbal and figurative expression are recommended. The review of studies has pointed out that the relationship between the constructs may vary based on the type of creativity measure used.

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