

Influência de variáveis sociodemográficas no desempenho criativo: impacto no contexto educacional

The influence of sociodemographic variables on creative performance:
educational impact

Influencia de variables sociodemográficas en el desempeño creativo:
impacto educacional

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Received: January 06, 2026

Accepted: June 18, 2026

Published: June 24, 2026

RESUMO

Considerando que a literatura tem indicado que a criatividade sofre influência de variáveis sociodemográficas, o estudo avaliou a influência das variáveis gênero, escolaridade, região de moradia e faixa etária no potencial criativo de adolescentes, adultos e idosos. Participantes com idades entre 14 e 87 anos, de ambos os gêneros, provenientes da região Sudeste e Nordeste e diferentes níveis de escolaridade, em um total de 793, compuseram a amostra. Os participantes responderam ao Teste de Criatividade Figural versão adolescente e adultos (TCF-AA). Resultados do teste Mann-Whitney e Kruskal-Wallis indicaram a influência do gênero no fator enriquecimento de ideias e pontuação total, da região de moradia no fator emocional, sendo que escolaridade e faixa etária influenciaram, de forma significativa, os quatro fatores e pontuação total. Os resultados confirmam a necessidade de levar em consideração as características sociodemográficas específicas da população ao avaliar a criatividade. Esse resultado podem ajudar a proporcionar uma avaliação justa dessa habilidade, bem como uma base científica para estimulá-la em diferentes níveis educacionais.

Palavras-chave: Potencial Criativo; Avaliação; Educação.

ABSTRACT

Considering that the literature has indicated that creativity is influenced by sociodemographic variables, the study evaluated the influence of the variables gender, education level, region of residence, and age group on the creative potential of adolescents, adults, and older adults. A total of 793 participants, aged between 14 and 87 years, of both genders, from the Southeast and Northeast regions of Brazil, made up the sample. Participants completed the Figural Creativity Test – adolescent and adult version (TCF-AA). Results from the Mann-Whitney and Kruskal-Wallis tests indicated the influence of gender on the idea enrichment factor and total score, and of

region of residence on the emotional factor, whereas education level and age group significantly influenced all four factors and the total score. The results confirm the need to take the population's specific sociodemographic characteristics into account when assessing creativity. This finding can help provide a fair assessment of this skill, as well as a scientific basis for fostering it at different educational levels.

Keywords: Creative Potential; Assessment; Education.

RESUMEN

Considerando que una literatura tem indica que a criatividade sofre influência de variáveis sociodemográficas, o estudo avaliou a influência das variáveis gênero, escolaridade, região de moradia e faixa etária no potencial criativo de adolescentes, adultos e idosos. Participantes con edades entre 14 y 87 años, de ambos géneros, provenientes de la región Sudeste y Nordeste y diferentes niveles de escolaridad, en un total de 793, compuseram a mostra. Los participantes respondieron al Teste de Criatividade Figural versão adolescente y adultos (TCF-AA). Los resultados de las pruebas de Mann-Whitney y Kruskal-Wallis indican que la influencia del género no es un factor de enriquecimiento de ideas y de pontuação total, la región de moradia no es un factor emocional, ya que la escolaridad y la faixa etária influyen, de forma significativa, en los cuatro factores y el pontuação total. Los resultados confirman la necesidad de tomar en consideración las características sociodemográficas específicas de la población para evaluar la creatividad. Este resultado puede ayudar a proporcionar una evaluación justa de sus habilidades, ya que es una base científica para estimular la educación en diferentes niveles.

Palabras clave: Potencial Criativo; Evaluación; Educación.

Introduction

Creativity has been valued, as never before, as an essential skill by researchers from different fields (Green *et al.*, 2023), constituting a growing area of research. According to these authors, different sectors such as education, the arts, research, and industry have increasingly invested in understanding this construct, as well as its assessment and development. Together with critical thinking, communication, and collaboration, creativity has been highlighted as one of the essential skills of the 21st century (Grey; Morris, 2022).

Such is its importance that the assessment of this characteristic was included in the Programme for International Student Assessment in 2022, involving 140,000 15-year-old students from more than 60 countries (Kapoor; Kaufman, 2025). The assessment was conceived with the aim of providing policymakers with reliable data to guide evidence-based decisions applied to educational policies and innovative pedagogies, so as to foster creativity within educational systems and prepare individuals for future challenges (Cuesta-Hincapie; Salamanda, 2025).

Among the various definitions of creativity, it can be understood as the capacity to produce novel, unusual, and appropriate responses within a social context (Plucker *et al.*, 2004). This skill has proven essential for the 21st century, as it allows individuals

to expand their capacity to respond flexibly to new demands and situations (Domingues, 2024).

Unlike traditional conceptions that link creativity solely to major innovations or works of art, it is necessary to understand that creativity is a skill present in all individuals, at least as potential, and that it can even be developed and expanded under appropriate environmental conditions (Diawati; Ausat; Augustin, 2023). Consequently, educational policies in different countries have devoted attention to creativity, aiming to promote this skill in schools.

The development of creativity can occur through the direct and active teaching of personality characteristics associated with the creative person (e.g., tolerance of ambiguity, openness to experience, and mental flexibility) and creative techniques, as well as through indirect means, such as developing contexts that support creativity (Thornhill-Miller *et al.*, 2023). It is also important to consider that creativity can manifest itself at different levels and in different domains (verbal, figural, musical, bodily, among others), such that one cannot think of a single type of creativity (Ivcevic; Kaufman, 2024).

Given the multidimensionality of creativity, the literature has shown that the environment can influence its expression, either positively or negatively. In other words, an individual's interactions within a social and cultural context are important aspects of creative expression (Andrade; Barros; Ramlackhan, 2024). In recent years, there has been growing recognition that creativity needs to be understood in light of the context in which it manifests itself (Beineke, 2011).

This is because creativity is jointly influenced by contextual and social factors, particularly the type of experiences lived, and exposure and stimuli for creative expression (Acar *et al.*, 2023), with blocks to creativity potentially arising from individual characteristics, the sociocultural environment, and the school environment (Berg; Vestena; Costa-Lobo, 2020). In this sense, researchers from various countries have been pointing to the need to promote conditions favorable to creative expression, so that the creative potential present in each individual can develop more adequately (Kaufman *et al.*, 2011).

In this way, creativity could be seen as a resource through which individuals can compensate for the social and cultural differences of the environment in which they live, enabling them to solve problems (Sierra *et al.*, 2015). Moreover, it has shown an important relationship with life outcomes, including the maintenance of emotional well-being, coping with risks and challenges, and serving as a tool to help overcome difficulties (Oliveira *et al.*, 2016).

It should be noted that sociocultural factors influence creative potential, such that research on this topic has reinforced the importance of the social, historical, and cultural context in the creative process (Nakano *et al.*, 2014). From this perspective, creativity cannot be understood by isolating the individual from their context. It is thus recognized that creativity is socially defined through the interaction between contextual factors (available resources, beliefs, values, traditions, and socioeconomic, social, political, educational, cultural, and family factors) and personal factors (personality, intelligence, knowledge, and experience) specific to the environment, which can exert

a considerable influence on an individual's creative potential (Kharkhurin, 2010; Meintjes; Grosser, 2010).

Furthermore, it is necessary to understand that creativity is a multidimensional construct, influenced by both intrinsic and environmental factors, and thus has a complex relationship with culture (Shao *et al.*, 2019). The present study investigates differences in creative performance arising from the variables of gender, age, education level, and region of residence.

Influence of gender on creativity

Gender differences in creativity have proven to be a controversial and complex issue that has been intensively investigated for at least four decades without any consensus being reached (Nakano; Oliveira; Zaia, 2021). Different developmental trends according to gender have been reported (Alfonso-Benlliure; Santos, 2016; Lau; Cheung, 2010), explained by differences in socioenvironmental factors, including socialization practices and differentiated educational expectations and opportunities (Said-Metwaly *et al.*, 2021a).

In general, the literature has highlighted the absence of consistent differences favoring one gender or the other (Baer, 1999; Baer; Kaufman, 2006; Reese *et al.*, 2001; Kaufman *et al.*, 2010). A review of 194 studies conducted by Taylor *et al.* (2024) demonstrated the existence of minimal and inconsistent differences between the creative achievements of men and women, varying according to creative domain, task type, scoring type, and study region. However, differences were also found in the review conducted by Nakano *et al.* (2021), since the analysis of 133 studies indicated that most of them reported gender differences, most commonly favoring women. Finally, a review by Kim *et al.* (2024) showed that men and women differ in creativity in terms of the type of support for its expression; after a meta-analysis of 753 samples, they found that women are more creative due to empathy, while men are more creative due to greater risk-taking. Based on these studies, it can be seen that literature reviews also fail to reach consensus.

Although most studies do not indicate differences between men and women in creative potential, women show fewer creative achievements (Taylor; Barbot, 2021). That is, when awards or creative recognition in different fields are analyzed, a predominance of men can be observed (Stoutzfus *et al.*, 2011), such that women are more often not recognized and face gender inequality at the professional, personal, and sociocultural levels, namely, barriers to opportunities, attaining prominent positions, and earning potential compared to men (Ginis; Stewart; Kronborg, 2023). In other words, although women show creative potential at a level equal to that of men, their output is less valued and recognized (Nakano; Wechsler, 2025). This situation can be understood if we consider that, in most cultures, traits associated with the male gender are more strongly associated with creative performance (Li *et al.*, 2024).

Various reasons have been found, ranging from the historical predominance of creativity research on male individuals (Eisler; Montuori, 2007), lack of environmental support, differing societal demands and expectations, and gatekeeping in many fields

by men, which has hindered women's achievements in almost all domains (Baer; Kaufman, 2006). Furthermore, Matud *et al.* (2007) argue that research seems to indicate that the explanation for gender differences in creative performance appears to result mainly from a combination of environmental factors: (1) historical gender differences in access to education and resources, (2) different expectations for men and women, and (3) different standards in judging creative products developed by each gender.

Thus, studies on gender differences in creativity remain limited, and it is not exactly known whether educational and sociodemographic factors exert an equal influence on the creative thinking of men and women, so this issue deserves further investigation (Matud *et al.*, 2007). This kind of finding gives rise to the need to encourage the development of a broader model that considers the creative traits and domains present in both genders (Kaufman *et al.*, 2010).

Influence of age on creativity

The investigation of the relationship between age and creativity has proven to be a topic of great interest to researchers (Amabile, 1996). However, despite decades of research on this issue, doubts remain about the developmental trajectory of creativity across the lifespan (Barbot *et al.*, 2016; Lau; Cheng, 2010).

In general, it might be expected that children and adolescents would increase their creativity as they age, since cognitive maturation and educational and social experiences become richer (Said-Metwaly *et al.*, 2021a). However, the literature has indicated that periods of creative slumps and jumps would occur during childhood and adult life, indicating moments of progress and regression (Gralewski *et al.*, 2016), although there is no consensus regarding the number, magnitude, duration, and timing of these moments.

Three important slumps are commonly reported, occurring around 5–6 years of age (Torrance, 1968), 9–10 years of age (Darwish; Pakdaman, 2012), and 12 years of age (Said-Metwaly *et al.*, 2021a). The first would result from entry into formal education (Krampen, 2012) and the need to respect authority, follow rules, the limitation of spontaneous play, the demands of school discipline, and the stimulation of convergent thinking (Gralewski *et al.*, 2016). The second would be even more pronounced, resulting from expectations of passive classroom conduct, the encouragement of correct answers, and the pursuit of social approval, such that children become afraid of engaging in creative activities that might result in rejection (Gralewski *et al.*, 2016). Conformity comes to be valued over divergence and novelty (Saggar *et al.*, 2019). Finally, the slump around age 12 would result from the strengthening of logical thinking, conflict between conformity and individuality, the pursuit of acceptance by significant others, physiological changes stemming from adolescence, and the development of independence and personal identity, conditions that can lead to a decrease in creativity (Gralewski *et al.*, 2016).

Studies focused on investigating the relationship between age and creativity in adult life have, in most cases, found no evidence (Madjar *et al.*, 2002) or even a

negative relationship between these variables (Zhou, 2003) characterizing a decline due to aging. There appears to be a disadvantage for older adults with regard to creativity (Alpaugh *et al.*, 1981), given the decrease in information-processing speed and lower willingness to risk original solutions (Ruth; Birren, 1985). Moreover, there is evidence of social judgment related to age stereotyping, as people persistently rate the creativity of an older person more negatively compared to that of a younger person (Oh *et al.*, 2023). This commonly involves the negative notion that older adults have limited judgment capacity, as well as difficulties in establishing strategies for carrying out processes and low motivation for dealing with uncertainty (Chan; Cheng; Ng, 2013). In this context, Shimonaka and Nakazato (2007) report that quantitative creativity, as measured by performance tests, declines with age, but creativity assessed qualitatively does not.

The literature has shown changes in creativity with age, especially related to changes in personal characteristics associated with creativity (Abra, 1989), with substantial variation across domains. When analyzing Nobel Prize winners, for example, Jones and Weinberg (2011) found that physicists made important contributions at earlier ages than chemists or medical scientists. In the same vein, developmental trends have been found to vary according to the aspect of creativity being assessed (Barbot *et al.*, 2019). For example, when comparing sixth-grade elementary school students and university students, performance varies according to domain. University students perform better on real-life problems, while the former perform better on figural tasks, with no difference found for verbal creativity.

These findings, however, are not universally accepted, and studies have also been reported that found no relationship between age and creativity (Amabile *et al.*, 2005; Eder; Sawyer, 2007; Madjar *et al.*, 2002) or even a negative relationship (Zhou, 2003). A meta-analytic review conducted by Eder and Sawyer (2007) showed that results vary widely across studies and that this relationship can be moderated by other factors (Binnewies; Ohly; Niessen, 2008).

Influence of education level on creativity

Similarly, education level can influence creativity (Acar *et al.*, 2023). Some studies have indicated a continuous upward trajectory in creativity across all levels of education (Hong; Milgram, 2010; Said-Metwaly *et al.*, 2021a). Other studies indicate an irregular trajectory, marked by significant slumps at certain periods (Kim, 2011), especially in the 4th grade (Darvishi; Pakdaman, 2012; Lubart; Georgsdottir, 2004; Torrance, 1967), and it is important to note that inconsistencies regarding the existence and timing of these slumps characterize this issue.

Some of the possible causes for these slumps include the possibility that they occur during periods of school transition (e.g., when children move from elementary school to high school), when children and adolescents have to deal with the stress and demands imposed by the new school system (Torrance, 1967). The need to adjust to the new reality, along with a greater need for awareness of social rules and of the need for acceptance, would lead children to provide appropriate responses that meet social norms or expectations, rather than providing unique or unusual responses, thereby

exerting pressure toward conformity that runs counter to creativity (Gralewski *et al.*, 2016; Kim, 2011).

Other explanations relate to a cognitive shift. Between the ages of 9 and 10, creativity would decline due to the need for more intensive use of logical thinking and the effect of hormonal changes, changes in brain structures, and identity development (Said-Metwaly *et al.*, 2021a). Such decreases would be temporary and followed by recovery. However, a review study conducted by the authors indicated that no evidence of a 4th-grade slump was found in the studies analyzed, with such a slump instead being observed in the 7th grade. Similar results have been reported by other researchers (Jastrzębska; Limont, 2017; Lau; Cheung, 2010), explained by neurobiological changes stemming from puberty and the emergence of hypothetical and abstract reasoning. Periods of decline in creative performance are commonly observed, especially in the fourth grade of elementary school (Acar *et al.*, 2023).

Influence of region of residence on creativity

According to Shao *et al.* (2019), creativity is present in all cultures, although its definition and attributes vary depending on a set of existing representations, concepts, symbols, rules, and notions, such that culture can be understood as an important factor that determines and recognizes the creativity of individuals or groups in various settings.

However, despite this observation, a still limited number of studies have investigated the influence of sociocultural factors on creativity. Tsai (2012) argues that most studies are based on comparisons between cultural groups, notably Western and Eastern groups, noting that another type of study, still little explored, focuses on the analysis of subgroups. This observation is grounded in the recognition that nations are not homogeneous, with cultural variations between groups within the same country standing out as an important point to be examined.

On this issue, Wechsler (2001) highlights the need to identify and promote creativity while respecting the specific characteristics of each nation. Thinking specifically about the case of Brazil, one of the most striking features of our society concerns its great cultural richness. In a country of continental dimensions, differences are numerous, whether historical, cultural, or economic, which is why it becomes a challenge to grasp the degree of diversity present in the country's various regions (Fernandes, 2001). For this reason, multiculturalism has been brought to the fore in more recent debates, given the need to understand society as constituted by plural identities based on the diversity of races, genders, social classes, cultural and linguistic patterns, abilities, and other markers (Canen; Oliveira, 2002), with the regional differences present in Brazil standing out. Differences due to cultural aspects are commonly reported in the scientific literature, most often comparing Western and Eastern countries. The results show that countries that value collectivism and conformity (usually Eastern countries) exhibit lower creativity than those marked by individualism and autonomy (Western countries).

Given the recommendations of the scientific literature, according to which researchers have reinforced the importance of not disregarding the impact of cultural differences and educational systems on creativity (Kapoor; Tagat, 2025), and given the differences in creative expression pointed out in the theoretical review conducted, the present study aimed to evaluate the influence of sociodemographic variables on the creative performance of adolescents, adults, and older adults. More specifically, it sought to investigate the influence of gender, age group, education level, and region of residence.

Method

Participants

The sample was composed of 793 participants, aged between 14 and 87 years ($M = 29.8$; $SD = 20.51$), from two Brazilian regions: Southeast ($n = 438$) and Northeast ($n = 355$). Of these, 52.7% were female. Participants had different levels of education, namely: elementary education (*ensino fundamental – EF*)¹ ($n = 124$), high school (*ensino médio – EM*) ($n = 452$), and higher education (*ensino superior – ES*) ($n = 217$).

Instrument

Figural Creativity Test – adolescent and adult version (*Teste de Criatividade Figural – versão adolescentes e adultos – TCF-AA*) (Nakano, 2024).

The instrument consists of two activities in which incomplete stimuli are provided that must be completed in the form of drawings. In the first activity, participants are asked to complete a series of ten different stimuli, and in the second, to produce as many drawings as possible from the same stimulus (repeated 30 times).

The test enables the assessment of figural creativity by scoring 12 creative characteristics based on the drawings produced: fluency (number of relevant ideas offered by the subject), flexibility (diversity of types or categories of ideas), elaboration (addition of details to the basic drawing), originality (unusual ideas), expression of emotion (expression of feelings in the drawings or titles), fantasy (presence of imaginary beings, fairy tales, or science fiction), movement (expression of movement in the drawings or titles), unusual perspective (drawings made from unusual angles), internal perspective (an internal view of objects in the form of transparency), use of context (creation of a setting for the drawing), extending boundaries (extending the stimuli before completing the drawings), and expressive titles (going beyond the obvious description of the drawing, abstracting it).

These characteristics are grouped into four factors: F1 = idea enrichment; F2 = external aspects; F3 = cognitive aspects; and F4 = emotional aspects, in addition to a

¹ **Translator's note:** In Brazil, elementary education (*ensino fundamental*) comprises grades 1–9 (ages approximately 6–14), and high school (*ensino médio*) comprises grades 10–12 (ages approximately 15–17).

total score (Nakano; Batagin; Fusaro, 2022). These factors make it possible to identify the strongest and weakest areas of an individual's creative potential.

Procedures

The present study was approved by the Research Ethics Committee of the host institution. All participants signed the Free and Informed Consent Form (*Termo de Consentimento Livre e Esclarecido* – TCLE) as a requirement for participation in the research. For participants under 18 years of age, the TCLE was signed by their parents/guardians, who also signed the Assent Form (*Termo de Assentimento*).

The tests were administered in person, either individually or collectively, in a single session with an estimated duration of 30 minutes. The tests were scored by undergraduate research, master's, and doctoral students after training. Each participant's results were estimated for the four factors and the total score, and were entered into a single spreadsheet.

Data analysis

Statistical analyses were performed using JASP software, version 0.16.3. Results with $p \leq 0.05$ were considered significant. Data were first analyzed to verify their normality. The Shapiro-Wilk test indicated that the distribution was not normal ($p < 0.001$) for all factors and the total score. Non-parametric analyses were therefore used.

Descriptive statistics for the four creativity factors and the total score were estimated (mean, standard deviation, minimum, and maximum), and the influence of the variables gender and region was subsequently investigated using the Mann-Whitney test. In these cases, effect size was also calculated. The variables education level and age group were analyzed using the Kruskal-Wallis test, and in cases that proved significant, a post hoc test was applied to identify between which groups the differences were significant.

In addition, the effect size of the mean differences between groups was calculated using Cohen's d. The reference values used for interpretation follow those presented by Espírito-Santo and Daniel (2015): values below 0.19 are considered negligible, values between 0.20 and 0.49 indicate a small effect, between 0.50 and 0.79 a medium effect, between 0.80 and 1.29 a large effect, and values above 1.30 represent a very large effect.

Results

Descriptive statistics by gender were first estimated, together with the Mann-Whitney test, to verify whether the means showed significant differences between groups. The results, presented in Table 1, indicated that differences were found for Factor 1 (Idea Enrichment) and the total score.

ISSN: 1984-6444 | <http://dx.doi.org/10.5902/1984644494451>

Table 1 - Descriptive statistics, mean difference test, and effect size by gender

Measure	Group	Mean	SD	U	p	Effect size
F1	F	37.90	23.78	9981.50	< 0.001	0.274
	M	27.27	19.01			
F2	F	6.61	7.30	73326.50	0.116	-0.064
	M	7.11	6.35			
F3	F	43.69	16.85	82613.50	0.188	0.054
	M	42.12	16.24			
F4	F	2.48	17.62	82408.50	0.118	0.051
	M	1.58	10.44			
Total	F	88.96	39.83	92161.00	< 0.001	0.176
	M	77.06	34.74			

Source: prepared by the author. Note: F = female (n = 418); M = male (n = 375); F1 = idea enrichment, F2 = external aspects, F3 = cognitive aspects, and F4 = emotional aspects.

The results for Factor 1 and the total creativity score are significantly different between female and male participants. In both cases, female participants showed higher means, with negligible and small effect sizes, respectively.

Next, the influence of region of residence was investigated. The sample was divided between Southeast (n = 438) and Northeast (n = 355). The Mann-Whitney test was applied again. The results are presented in Table 2.

Table 2 - Descriptive statistics, mean difference test, and effect size by region of residence

Measure	Group	M	SD	U	p	Effect size
F1	Northeast	33.49	19.72	83993.000	0.051	0.080
	Southeast	32.38	24.18			
F2	Northeast	7.17	7.12	84586.500	0.032	0.052
	Southeast	6.58	6.65			
F3	Northeast	44.04	16.24	81803.000	0.206	0.052
	Southeast	42.06	16.80			

ISSN: 1984-6444 | <http://dx.doi.org/10.5902/1984644494451>

F4	Northeast	2.97	18.76	79125.000	0.592	0.018
	Southeast	1.32	10.18			
Total	Northeast	85.38	34.98	82891.500	0.109	0.066
	Southeast	81.68	40.17			

Source: prepared by the author. Note: F1 = idea enrichment, F2 = external aspects, F3 = cognitive aspects, and F4 = emotional aspects.

The results indicated significant mean differences in Factor 2 (external aspects), favoring the group from the Northeast, with a negligible effect size. No significant differences were found in the other factors or in the total score.

Next, the influence of education level was analyzed using the Kruskal-Wallis test. Three groups were compared: elementary education (EF) ($n = 124$), high school (EM) ($n = 452$), and higher education (ES) ($n = 217$). For classification purposes, both those currently enrolled in each level and those who had already completed it were considered. The results can be seen in Table 3.

Table 3 - Descriptive statistics, mean difference test, and effect size by education level

Measure	Group	Mean	SD	χ^2	df	p
F1	EF	14.04	11.53	160.824	2	< 0.001
	EM	33.59	20.28			
	ES	42.15	24.40			
F2	EF	4.06	5.57	50.927	2	< 0.001
	EM	7.47	7.27			
	ES	7.13	6.29			
F3	EF	33.76	16.09	42.720	2	< 0.001
	EM	44.52	16.73			
	ES	44.93	14.76			
F4	EF	0.13	0.53	33.096	2	< 0.001
	EM	2.76	17.82			
	ES	1.69	11.07			
Total	EF	52.00	26.13	119.715	2	< 0.001

EM	86.27	36.15
ES	95.14	37.98

Source: prepared by the author. Note: M = mean; SD = standard deviation; df = degrees of freedom; F1 = idea enrichment, F2 = external aspects, F3 = cognitive aspects, and F4 = emotional aspects.

The results indicated significant differences in all factors and in the total score in relation to education level. Higher means varied between groups: in F1, F3, and the total score, they were significantly higher for higher education (ES), whereas in F2 and F4 they were higher for high school (EM).

A more in-depth analysis showed, in the Tukey post hoc test, that in F1 the differences between all groups were significant. In F2, only between EF and EM ($t = -4.967$; $p < 0.001$) and between EF and ES ($t = -4.030$; $p < 0.001$). In F3, between EF and EM ($t = -6.592$; $p < 0.001$) and between EF and ES ($t = -6.157$; $p < 0.001$). In F4, none of the pairwise comparisons were significant. In the total score, between EF and EM ($t = -9.573$; $p < 0.001$), between EF and ES ($t = -10.853$; $p < 0.001$), and between EM and ES ($t = -3.043$; $p = 0.007$).

Finally, the influence of age group was also investigated. Participants were grouped into four age brackets: adolescents up to 18 years old ($n = 324$), young adults between 19 and 30 years old ($n = 269$), adults between 31 and 59 years old ($n = 38$), and older adults above 60 years old ($n = 161$). The Kruskal-Wallis test was applied (Table 4).

Table 4 - Descriptive statistics, mean difference test, and effect size by age group

Measure	Group	M	SD	X ²	df	p
F1	Up to 18	28.14	19.08	206.099	3	< 0.001
	19–30	45.26	21.78			
	31–50	46.47	28.18			
	60+	18.48	13.75			
F2	Up to 18	8.00	7.27	197.124	3	< 0.001
	19–30	8.17	6.00			
	31–50	7.73	10.22			
	60+	2.13	3.73			
F3	Up to 18	44.27	16.58	84.410	3	< 0.001
	19–30	46.97	14.30			

ISSN: 1984-6444 | <http://dx.doi.org/10.5902/1984644494451>

	31–50	46.13	20.16			
	60+	32.82	15.21			
F4	Up to 18	3.00	18.45	68.776	3	< 0.001
	19–30	1.34	9.37			
	31–50	7.39	30.65			
	60+	0.11	0.53			
Total	Up to 18	81.15	34.79	191.653	3	< 0.001
	19–30	101.20	34.16			
	31–50	101.81	46.34			
	60+	53.55	26.75			

Source: prepared by the author. Note: M = mean; SD = standard deviation; df = degrees of freedom; F1 = idea enrichment, F2 = external aspects, F3 = cognitive aspects, and F4 = emotional aspects.

According to Table 4, it can be seen that differences between age groups are significant for all factors and the total test score. For most measures, with the exception of F1, means are higher in the group aged between 19 and 30 years. Only in F1 are they higher in the 31–50 age bracket.

Discussion

Considering that creativity is a potential present in all individuals (Berg *et al.*, 2020), that it can manifest at different levels (Acar *et al.*, 2020), and that its expression can be influenced by various factors, including sociodemographic factors, the present study was conducted with the aim of identifying the influence of the variables gender, age group, region of residence, and education level on a measure of figural creativity.

By recognizing its multidimensional nature (Hernández-Torrano; Ibrayeva, 2020), which includes, among other aspects, cognitive processes, personality traits, and environmental influences (Said-Metwaly *et al.*, 2021b), the study sought to contribute scientific evidence regarding the factors that can influence creative expression. Among the main ones, the presence of a welcoming environment favorable to new ideas, which offers opportunities to raise questions and is marked by freedom of expression, regardless of the sociodemographic characteristics of those generating the ideas, tends to favor creative expression (Andrade; Barros; Ramlackhan, 2024).

Especially in the educational context, the need to develop creative individuals can be achieved by including this objective in educational plans, from basic education to the highest levels of higher education (Gontijo, 2007). By identifying the

sociodemographic factors that influence creativity, it is hoped that this knowledge can be used, for example, to inform the development of strategies aimed at encouraging and developing creativity at all levels of education, taking into account the particularities of the target audience.

Before discussing these results, it is worth noting that figural creativity, as assessed in this study, has proven to be an appropriate measure for assessing a wide age range, levels of education, and different cultures (Jobirovna, 2023; Nakano *et al.*, 2025).

Among the variables investigated, the results indicated that participant gender influences one of the factors (Factor 1 – idea enrichment) and the total creativity score. Female participants showed more elaborate responses than male participants, presenting more refined and well-planned ideas (Nakano, 2024). They also stood out on the instrument's total score, showing an ability to generate many ideas in response to a problem, working on ideas to improve and complement them in an original way and from a different point of view. Although the reported female superiority confirms the findings of several studies (Alencar, 1975; Dudek *et al.*, 1993; Fleith; Alencar, 2006; Kaufman *et al.*, 2010; Kim; Michael, 1995; Krumm; Lemos; Filippett, 2014; Lin; Wong, 2014; Nakano; Wechsler, 2006; Osborn, 1975; Rejskind; Rapagna; Gold, 1992; Rosa; Qualls; Ruth, 2014; Shimonaka; Nakazato, 2007; Wechsler *et al.*, 2010), it is not universally accepted in the literature.

Considering region of residence, significant differences were observed only in F2, with higher means in the group from the Northeast. People who perform well on this factor find it easy to visualize their ideas in non-traditional ways, including different perspectives and points of view. They are able to use their imagination to perceive problems in different ways (Nakano, 2024). Moreover, they are also open to visualizing ideas beyond an external characteristic, paying attention to the internal workings and dynamics of things. The recognition of differences due to region of residence confirms Tsai's (2012) observation that variations in creativity due to cultural factors are found among groups within the same country. Especially in Brazil, these findings reinforce the need for the specific characteristics of each region and the country's diversity to be recognized (Fernandes, 2001; Wechsler, 2001).

With regard to education level, differences are found in all factors and in the total score. Interestingly, participants with elementary education did not stand out on any of the measures. Sometimes participants with high school education, sometimes those with higher education, showed higher means, a finding that confirms the literature indicating that education level can influence creativity (Acar *et al.*, 2023). It is worth emphasizing, however, that most research with this aim focuses on investigating children's creativity across different grades, especially in elementary school, and that studies comparing different levels of education are scarce. This may be an important contribution of the present study.

Finally, the influence of age group showed that means were significantly higher in the group aged between 19 and 30 years. Interestingly, the oldest age bracket showed the lowest means on all measures. This pattern reinforces the notion of older

adults' creative disadvantage and the stereotypes involved (Alpaugh *et al.*, 1981; Chan *et al.*, 2013; Oh *et al.*, 2023).

When considering the realities and differences found due to sociodemographic characteristics, we can think about an environment that favors this skill, bearing in mind that it only manifests and develops through the integration of elements internal and external to the individual (Tavares; Suanno; De la Torre, 2024).

In the educational context, the assessment of creativity can help teachers get to know students' characteristics, promote an environment favorable to its expression in the classroom, help ensure that this skill is included in the school curriculum, and provide information that can be used to plan programs aimed at developing students' creativity (Long; Wang, 2022; Nakano; Wechsler, 2018; Puccio; Murdock, 1999). Knowledge of the aspects that impact creative expression can help researchers discover strengths and weaknesses in individuals and ways to stimulate these skills in people with particular profiles (Treffinger *et al.*, 2013).

Taken together, the findings point to sociodemographic variables that can influence the creative expression of individuals with different profiles. Thus, by verifying that differences are found in relation to participants' gender, education level, region of residence, and age group, these data can be used to inform the design of strategies for developing and stimulating creativity suited to people with different profiles.

Final Considerations

By investigating the influence of sociodemographic variables on creative expression, the present study sought to deepen discussions found in the scientific literature that, to date, have not reached consensus among researchers. In this sense, it is important to note that the data from the Brazilian sample reproduce international findings, thereby confirming that creativity depends not only on individual characteristics but also on environmental elements.

Despite the importance of the results reported here, caution is recommended in generalizing them, since some limitations were present. Among these, we can highlight, in particular, the composition of the sample. Participants from only two Brazilian regions made up the sample, so different results might be found if the remaining regions were included in future studies. Likewise, it should be noted that creativity is a domain-specific construct, and only figural creativity was assessed in this study. Other forms of creative expression may yield different results.

It is hoped that studies aimed at investigating the aspects that influence creative expression will increasingly be conducted in the country, so that their findings can guide practices better suited to the development of this skill, which is so highly valued nowadays in a wide range of contexts, especially considering the sociodemographic diversity found in Brazil.

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