

Gender Differences in Creativity: A Systematic Literature Review

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ABSTRACT – In order to understand trends reported in research carried out about gender differences in creativity, a systematic review of the scientific literature on the electronic databases Scielo, Pepsic, CAPES Periodicals, Academic Search Premier, Academic Search Elite, Redalyc, and MEDLINE Complete was held. The 133 publications analysis showed that the articles were published between 1975 and 2020, most of them of international origin (82.71%). Most studies reported gender differences, with 45.20% in favor of women. Another 23.28% in favor of men, and 31.50%, oscillating according to the content evaluated. There was no consensus on the issue since inconsistent results were found, sometimes indicating the predominance of better results achieved by women, sometimes by men, in the same measures. This finding reinforces the importance that studies of this nature consider the influence of other factors, such as attitudes, motivation, opportunities, and the type of measure used to establish more accurate results.

KEYWORDS: sex, creative potential, divergent thinking, state of the art

Diferenças de Gênero na Criatividade: Revisão Sistemática de Literatura

RESUMO – Para compreender as tendências relatadas nas pesquisas realizadas sobre diferenças de gênero na criatividade, uma revisão sistemática da literatura científica foi feita nas bases eletrônicas Scielo, Pepsic, Periódicos CAPES, *Academic Search Premier*, *Academic Search Elite*, *Redalyc* e *MEDLINE Complete*. A análise de 133 publicações mostrou que os artigos foram publicados entre os anos de 1975 e 2020, predominantemente de origem internacional (82,71%). A maioria dos estudos relatou diferenças de gênero, sendo 45,20% a favor das mulheres, 23,28% a favor dos homens e 31,50% oscilando de acordo com o conteúdo avaliado. Não houve consenso sobre a questão, uma vez que foram encontrados resultados incoerentes, ora indicando a predominância de melhores resultados alcançados pelas mulheres, ora pelos homens, nas mesmas medidas. Esse achado reforça a importância de que os estudos dessa natureza considerem a influência de outros fatores, como atitudes, motivação, oportunidades e tipo de medida utilizada para estabelecer resultados mais precisos.

PALAVRAS-CHAVE: sexo, potencial criativo, pensamento divergente, estado da arte

Creativity has been defined as the interaction between aptitude, process, and environment, through which an individual produces a product that is perceived, within a social context, as new and useful (Plucker et al., 2018). It is considered a skill present in all people, at least as a potential, which can manifest itself at different levels and domains, being understood as a multidimensional construct.

Considering the amplitude of the construct, a dimension that has received prominence in the investigation of this

construct involves research on environmental conditions and situations external to the individual that, in some way, promote or inhibit creative expression (Nakano & Wechsler, 2012). Among these factors, the gender difference has recently been explored within the psychological research related to this construct (Abraham, 2016), marking itself a controversial issue for more than a century (Odzemir & Sak, 2013) and investigated as one of the factors responsible for the variation in individual creativity. Reflections on the topic consider

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that men and women may differ in their aspects related to creativity due to biological and/or sociocultural influences (Bart et al., 2015), even though the findings are inconsistent (Baer & Kaufman, 2008; Kimmelmeier & Walton, 2012; Prado et al., 2016). The theme has been controversial and based on different views (Sayed & Mohamed, 2013).

Different theories analyzed gender differences in creativity, involving, for example, explanations based on the different expectations, opportunities, and types of experiences encouraged in each genre (Baer & Kaufman, 2008). In this way, gender differences in creativity have been explained as a result of sociocultural and environmental factors (Ai, 1999; Romo, 2018), gender stereotypes, different levels of social support granted to each gender (Baer & Kaufman, 2008), various barriers perceived by each gender (Morais & Almeida, 2019), as well as due to genetic factors (Vernon, 1989). More recently, interest in understanding the influence of gender on creativity has come to include studies in neuroscience (Abraham et al., 2014).

In general, literature reviews carried out aiming to identify gender differences in creativity indicated that most studies report the absence of significant differences. Those with different results tend to favor the female gender (Rejskind et al., 1992), with a small number of those who point to male superiority (Runco, Cramond, & Pagnani, 2010).

Four different results have been reported in the scientific literature: studies that claim female superiority, studies that indicate male superiority, studies that state that there are no differences between men and women, and finally, studies that have shown performance fluctuation, depending on the evaluated content. Some studies are cited to explain each of these results.

Research showing the superiority of women is found on the international scene (Dudek et al., 1993; Kaufman et al., 2010; Kim & Michael, 1995; Krumm et al., 2014; Lin & Wong, 2014; Osborn, 1975; Rosa et al., 2014). These data were collected using instruments based on verbal or figurative activities of divergent thinking. In Brazil, several studies have also reported this result, using both figurative activities and specific training programs in the construct (Alencar, 1975; Fleith & Alencar, 2006; Nakano & Wechsler, 2006; Virgolim & Alencar, 1993; Wechsler, 1987; Wechsler et al., 2010).

The second possibility, which argues that creativity would be higher in men, can be exemplified based on the results of Brazilian studies such as those conducted by Mendonça and Fleith (2005) and Alencar (1997). They used verbal activities or the perception of individuals about their creativity to find such results. International studies have also reported superior results for males (Gralewski & Karwowski, 2013; Horner, 1972; Kiehn, 2003; Lau & Cheung, 2015; Matud et al., 2007; Stoltzfus et al., 2011). They used practical tasks, verbal and figurative activities to assess creativity.

A third group of studies demonstrates the absence of differences in creativity considering the genre. In the scientific literature, most studies confirm this aspect, both in the international context (Baquedano & Lizarraga, 2012;

Beghetto et al., 2011; Chae, 2003; Chen et al., 2002; Dikici, 2014; Garaigordobil & Berruero, 2011; Ghayas et al., 2012; Kousoulas, 2010; Leu & Chiu, 2015; Phipps & Prieto, 2015; Raels et al., 2013; Tsai, 2013, 2014; Xiong et al., 2015) and Brazilian context (Almeida et al., 2013; Cavalcanti, 2009; Filho & Alencar, 2003; Fleith & Alencar, 2012; Matos & Fleith, 2006; Nakano, 2012; Nakano & Brito, 2013; Nakano et al., 2011; Nakano & Castro, 2013; Nakano et al., 2010; Suárez & Wechsler, 2019; Tentes, 2011).

Regardless of their origin, these studies analyzed their results from different methods and instruments aiming creativity assessment, such as tests of divergent thinking, verbal and figural creativity tasks and self-assessment, based on opinions of teachers and/or judges. An essential part of these studies corroborates the idea that creativity would not be influenced by gender but that the differences found would involve the influence of cultural and environmental characteristics, which end up determining the ways of behaving for each gender (Aluja-Fabregat et al., 2000; Colom et al., 2000; Lynn, 1994; Nakano, 2006).

Within the studies that rule out the existence of differences, a possible explanation is based on the idea that creative people would not fit into stereotypes based on gender roles, corroborating psychological androgyny, described as one of the personality characteristics present in creative individuals. To a certain extent, these people would escape the rigid gender stereotypes (Montuori & Purser, 1995), being more similar to each other than being different because they are men or women (Aranha, 1997). In this way, women can manifest themselves as dominant and less submissive, while men can show a higher degree of sensitivity, not clinging to culturally established roles. Creative individuals would oscillate their characteristics according to the task's demand, which ends up generating greater ease of adaptation (De La Torre, 2005).

Finally, other studies argue that gender influence on creativity would depend on the type of creativity being assessed (Fleith & Alencar, 2008). In this sense, authors like Kim and Michael (1995) affirm that literature has pointed out women's superiority over men in verbal tests of creativity. In contrast, men have presented better performance in creative visual and spatial tests. Brazilian studies (Alencar, 1975; Gontijo & Fleith, 2009) corroborate the better male performance in mathematical activities and higher female performance in verbal activities. Prado, Alencar, and Fleith (2016), after reviewing literature, also conclude that, in general, male performance surpasses female performance in creative cognitive skills (fluency, flexibility, and originality). They also affirmed that while scores in non-cognitive factors, such as emotional and motivational dimension and even verbal creativity, is best scored by them. Internationally, different performances are also reported according to the creative content being evaluated (Baer, 1999; Bart et al., 2015; Cheung & Lau, 2013; He & Wong, 2011; Kim & Michael, 1995; Madjar et al., 2011; Runco, Millar, et al., 2010; Sternberg, 2006).

Considering these controversies, what can be verified is that there is no consensus in the scientific literature about the existence or not of differences in creativity in favor of one gender or another (Nakano & Wechsler, 2006), which can justify the contradictory and inconclusive findings due to complexity of the creativity construct, the different types of instruments used to evaluate it, and the diversity of the samples selected in the surveys (Baer, 1999; Kimmelmeyer & Walton, 2016). One cannot fail to consider that the

differences can also be justified in terms of other variables, such as age and educational level (Baer, 1999), making it difficult to estimate the isolated influence of the gender variable.

Thus, given the extensive debate identified in the scientific literature on this issue, the present study had, as its primary objective, to identify trends reported in empirical research, both Brazilian and international, which investigated gender differences in creativity.

METHOD

Search strategy

The researchers searched Brazilian databases (SciELO, Pepsic, and CAPES journals) and international databases (Academic Search Premier, Academic Search Elite, Redalyc and MEDLINE Complete) trials in August 2020.

The searching procedure was done and cross-checked by two reviewers independently. Search terms were the combined descriptors, “creativity AND sex”, “creativity AND gender”, and “creativity AND gender differences”. It

is important to note that the period was not limited in any of the searches. According to the Prisma model (Moher et al., 2009), the flowchart for selecting articles is shown in Figure 1. It is important to note that the last search for these articles occurred in August 2020.

Study Selection

The eligibility assessment was applied by screening the titles and abstracts before checking the full text.

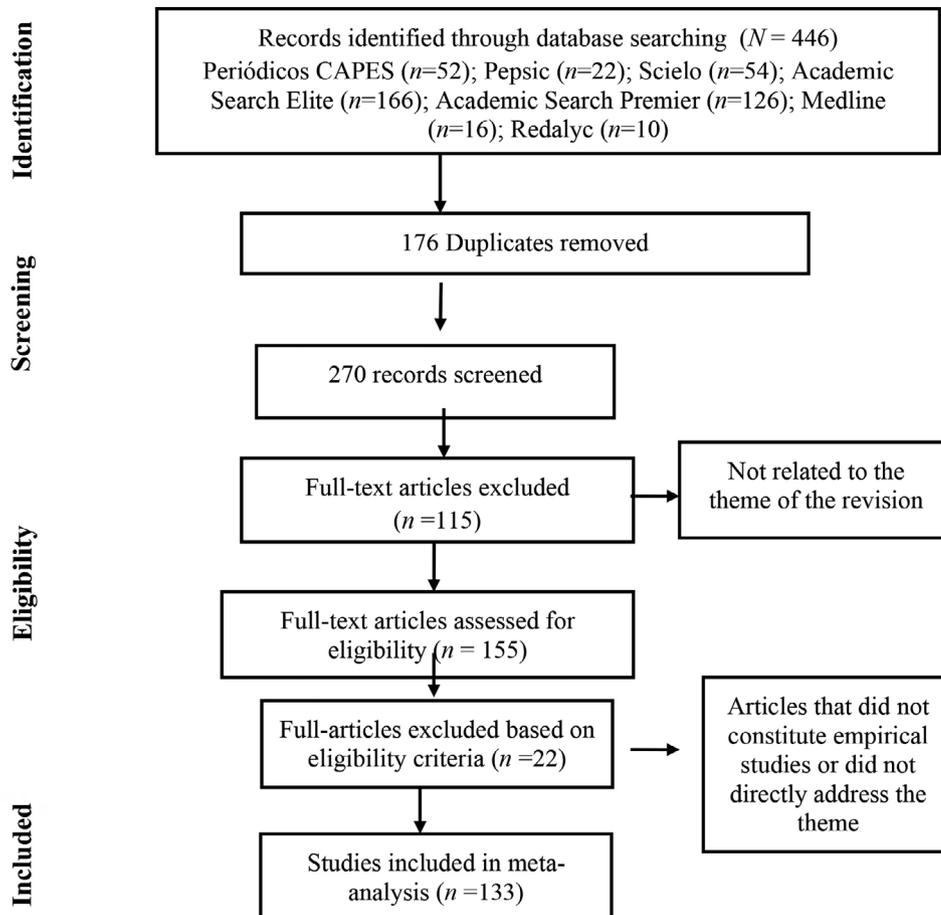


Figure 1. Flowchart of the study selection

Note. Adapted from Prisma model (Moher, et al., 2009).

Inclusion and exclusion criteria

The search initially resulted in 446 articles, located based on the keywords “creativity AND sex” (n = 48), “creativity AND gender” (n = 40), and “creativity AND gender differences” (n = 308). A refinement was made to exclude those that were not related to the topic, as well as duplicates. Thus, a total of 133 articles were selected from Scielo (n = 13), Pepsic (n = 3), Capes (n = 5), Academic Search Elite (n = 73), Medline (n = 14) and Redalyc (n = 25).

It should be noted that, in the case of international databases, the duplicates found were present in the Academic

Search Premier database. Thus, it was decided to eliminate all works identified on this basis. After selecting works, the criteria of which are described in the topic below, a total of 133 studies were selected, 23 Brazilian and 110 international.

Data extraction

Having selected the studies, they were analyzed concerning the year of publication, sample, the instrument used, data analysis method, a survey of the type of reported gender differences, and which creative characteristics were evaluated.

RESULTS

In order to understand the selected studies in detail, the first analysis carried out aimed at collecting data related to the year of publication. The results showed that the oldest publication found was made in 1975 and the most recent in 2020. Therefore, in this study, 46 years of publications on the subject were reviewed, with an average of 2.89 studies per annum. Such information can be seen in Figure 2. The studies were classified as international or Brazilian according to the database in which they were located.

The first international study found dates from 1975, while in Brazil, the first work found was published only in 2003. In general, it can be noted that there is a minimal number of studies conducted with this focus until 2004, the occasion when international research starts to focus on the issue more intensely. Specifically, since 2010, research on the influence of gender on creativity seems to have been expanded. Regarding the publication period, the year 2013 was the one with most papers (n = 15), followed by the years 2014 (n = 11) and 2010 (n = 10).

The analysis of the origin of the selected articles showed that research that investigated the influence of gender on creativity had been conducted in several countries, mainly in the United States (23.31%), Brazil (17.29%), China (9.77%),

and Spain (7.52%). Another 25 countries also published studies on the subject, but with less presence.

The data indicated a predominance of studies aimed at the adult population (47.37%), with frequent studies conducted with the child population (27.82%) and adolescents (21.80%). Some studies used more than one age group in their samples (n = 3). It is essential to inform you that only one study had its sample composed of older people.

Other observed data referred to the type of instrument used by the researchers. In the analyzed works, the authors used 65 different instruments to investigate the influence of gender on creativity. It should be noted that, among the researched studies, most of them made use of specific instruments to assess creativity, and few instruments were repeated in more than one study. Among the standardized instruments, the Torrance Tests of Creative Thinking (Torrance, 1974, 1990) were the most used by researchers (n = 9, 13.84%).

It is also important to highlight that other instrument formats, in addition to tests, were found, such as scales (n = 14; examples: Chinese Creativity Self-Rating Scale, Creative Attitude Scale, Creative Personality Scale; Creative Life Experiences Scale, Think and Create), inventories (n = 4; examples: Biographical Inventory for Creativity, Thinking

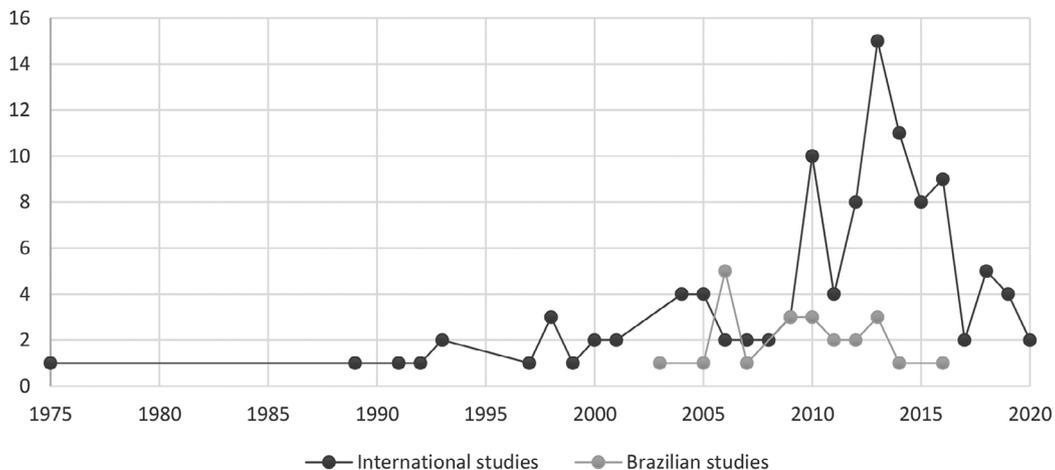


Figure 2. Publications per year, considering Brazilian and international studies.

Styles Inventory, Khatena-Torrance Creative Perception Inventory), questionnaires (n = 10; examples: Creative Self-Report Questionnaire, Creative Behavior Questionnaire, Creative Domain Questionnaire), as well as the assessment of creativity was also made from the use of creative tasks (n = 3; examples: alternative uses, creative tasks without specification, uses of objects).

Among the instruments used in the research, different materials were identified to assess not only creativity (58.29%) but also other constructs, such as personality (19.46%), intelligence (12.06%), skills (2.68%) and, at lesser extent, gender identity (n = 2), resilience, socio-emotional competence, critical thinking, teaching practices, life satisfaction and motivation (researchers found a study in each of these constructs). One study also mentioned qualitative strategies to access creative characteristics, such as interviews and documentary analyses, and two studies used an electroencephalogram.

Another data analyzed in the works refer to the way the data were analyzed. In general, most studies used statistical analysis, especially Univariate Analysis of Variance (n = 45), followed by Student’s T-Test for independent samples (n = 42), Multivariate Analysis of Variance (n = 29), Pearson or Spearman correlation (n = 15), Exploratory or Confirmatory Factor Analysis (n = 8) and Regression Analysis (n = 9). Only three studies used qualitative methods: analysis of interviews, analysis of the time of use of toys, and semantic analysis of responses.

Researchers focused the last analysis aiming to verify the existence or not of the gender difference in creativity.

We sought to identify in the works, firstly whether the gender difference was found or not. Then, in those where the difference was reported, to which gender the top performance belonged. And finally, when the difference between the genders was positive, it was investigated in which creative characteristics the favored genre stood out. The results were summarized in Table 1.

The results indicated that most of them showed gender differences in creativity (54.89%). Taking the origin of the studies, it appears that, among international studies, there was a predominance of results stating the gender difference (57.27%). Interestingly, in Brazilian studies there was a predominance of studies that did not report such differences (56.52%).

Among the studies that affirmed gender difference, favorable results for women were more commonly reported (n = 33), followed by studies that indicated that, despite the presence of differences, the results fluctuate between genders (n = 23). The smallest part demonstrated male superiority (n = 17). In the international context, most studies pointed to female superiority (45.20%) and, in the national context, fluctuation in performance depending on the content evaluated (50%).

A more in-depth analysis sought to investigate the differences between men and women due to the type of creativity. The analyzed articles that reported the existence of differences between genders were grouped into four groups: differences in measures of creativity as a general construct or creativity as specific domains: figural creativity, verbal creativity, and styles of thinking and creating. The results are summarized in Table 2.

Table 1

Summary of results on investigating the existence of gender differences in creativity considering the origin of publications.

Result found	Total (n=133)		International (n=110)		Brazilian (n=23)	
	F	%	F	%	F	%
No gender differences in creativity	60	45.11	47	42.72	13	56.52
Existence of gender differences in creativity	73	54.88	63	57.27	10	43.47
Superior performance presented by women	33	45.20	30	47.61	3	30.00
Superior performance presented by males	17	23.28	15	23.80	2	20.00
Performance fluctuation depending on the content evaluated	23	31.50	18	28.57	5	50.00

Table 2

Summary of results that indicated the existence of gender differences in creativity considering the construct as a general factor or specific factors

Gender / Measure	Women	Males
General creativity	adaptability, creative poems, creativity in general life, creativity in social occasions, humor, creative behaviors, mathematical creativity, artistic creativity, creativity self-assessment, narrative creativity	total creativity, self-perception of creativity, solving scientific creative problems, innovation in arts, creative achievement, mechanical / scientific creativity
Figural Creativity	fluency, flexibility, originality, unusual use, elaboration, abstraction of titles, figural creative index 1 and figural creative index 2	movement, fantasy, originality, resistance to premature closure, elaboration, fluency, flexibility
Verbal Creativity	total verbal creativity, flexibility, abstraction of titles	fluency, flexibility
Styles of thinking and creating	Relational-divergent style, Cautious-reflective style.	Objective-logical style

The results indicate non-consensual results between studies. Let's consider, for example, measures of general creativity. We can see that both women and men had significantly higher averages than the other gender in total / general creativity or self-perception / self-assessment of

creativity. Likewise, considering figural creativity, scores on the most common measures (fluency, flexibility, originality, elaboration) were achieved by both women and men, depending on the study.

DISCUSSION

The objective of this research involved carrying out an analysis of the influence of gender on creativity, based on the survey of empirical bibliographic productions, Brazilian and international. From the analyzed studies, the researchers found no consistency in studies related to the debate on gender differences, as also observed in previous studies (Baer & Kaufman, 2008; Prado et al., 2016; Sayed & Mohamed, 2013).

The results showed that the significant differences or not between men and women may vary depending on the sample involved, the type of creativity evaluated, the use of different methodologies, and the culture in which the study is carried out, so that, everything indicates that a consensus is still far from being reached. This reality, as determined by the bibliographic survey presented here, reinforces the need to consider that gender differences in creativity, if they exist, should be interpreted with some caution, given the diversity of methods, instruments, and samples involved in the investigation of the theme (Baer, 1999).

Some studies report that females have higher scores than males whereas there are studies that document the opposite, even though the former are more numerous (Baer & Kaufman, 2008). There are still those that do not report gender differences, so no consistent pattern has emerged from research on the subject. Consequently, given the inconsistencies found, any result should be analyzed with caution (Nakano & Brito, 2013).

So, considering the distribution of results, we can see that they meet those reported by Baer (1999) after a comprehensive review of 80 international studies. According to the author, half of these studies indicated no such controversial difference (in the study presented here, the proportion found was very close, 45.11%). In the remaining studies, two-thirds favored females and one third favored males, so that, depending on the study, women have some higher scores than men, and the reverse was also reported. These results can justify important differences between the other values, reported by the author for men and women, with those found here. He ended up making a simpler classification, which did not consider the possibility of result fluctuation, depending on the content evaluated.

Likewise, Abraham (2016) stated that, in the scientific literature, when gender differences in creativity are investigated, half of the surveys report the absence of significant differences, while a mixture of results characterizes those surveys belonging to the other half. The

author also points out that there are no secure foundations that can ensure the presence or absence of systematic differences between men and women about their creative potential and suggests the need for further exploration on the subject.

Among the analyzed aspects, the first data that drew attention from the bibliographic survey carried out was the reduced amount of published works on this theme, considering the period analyzed in the research. Such data points out that the questions about the influence or not of the gender in the creativity have not been one of the most important research focuses in the area, notably in the Brazilian context. The low frequency of publications about the influence of gender on creativity was also found by Bart et al. (2015) when stating that little attention has been directed to the investigation of gender differences in creativity, a fact that may contribute to the controversies found in the results of empirical studies.

Regarding how gender differences were assessed by the research that constituted the material in this study, it was possible to observe the predominance of psychological instruments aimed at assessing divergent thinking, through activities of verbal or figural nature. Thus, the amplitude of the construct and its multidimensionality end up not being considered in most works, which are more commonly limited to evaluating a type of creativity (for example, verbal or figurative). Such specificities act in such a way as to compromise the possibility of generalizing the results and the comparison between different studies. However, commonly, data based on specific methodologies or characteristics end up being generalized as measures of the construct as a whole (Abraham, 2016). Such a situation can contribute to the divergences so commonly found in this theme.

In view of the study's main objective, of understanding gender differences present in the scientific literature, the results indicated that most of the articles analyzed found differences between men and women in creativity. However, it is worth pointing out the result refers to the sum of studies that indicated better female performance, better male performance, and fluctuation of performance between genders. Therefore, it is not possible to affirm the superiority of either gender based on these data. According to Baer and Kaufman (2008), assuming that any gender difference in creativity is probably the product of different environments represents the best general synthesis of what we currently know about this issue.

An important finding was pointed out by Prado et al. (2016), when stating, after reviewing Brazilian research on the subject, that a distinction is found when analyzing general measures associated with creativity, in which little or no difference is reported between genders. The evaluation of specific factors such as fluency, flexibility, and originality, for example, already point to opposite results. In the study presented here, variations in the two measures (general and specific) of creativity pointed to contradictory results, sometimes favoring the female, sometimes the male, in the same measures.

However, it is also impossible to deny the influence of stereotypes due to social roles and, consequently, personality traits stimulated in each gender. Since childhood, women are encouraged to be more conformist, take less risks, and have less entrepreneurial capacity (Wai, 2013). Thus, they experience fewer opportunities related to creative expression (Gralewski & Karkowski, 2013), so that, historically, most of the writers, artists, scientists, and inventors who made significant creative contributions were men (Eisler et al., 2016).

Considering that in 45.11% of the works there is, notably, the perception of the lack of gender differences in creative performance, it is possible to reinforce the

hypothesis about the absence of differences due to the concept of androgyny, which involves the idea that creative people would escape the stereotype of roles due to gender (Aranha, 1997; Candeias, 2008; Montuori & Purser, 1995). Such individuals would present different characteristics according to the demand to facilitate their adaptation to the task (De La Torre, 2005).

About one third of the surveys indicated that the results may vary between men and women, confirming the idea that creativity would not be influenced by gender. Another characteristic belonging to the social contexts the individual is inserted could be responsible for the differences (Aluja-Fabregat et al., 2000; Colom et al., 2000; Lynn, 1994; Nakano, 2006). Similarly, the type of creativity being evaluated (Baer, 1999; Cheung & Lau, 2013; Fleith & Alencar, 2008; Kim & Michael, 1995; Madjar et al., 2011; Runco, Millar, et al., 2010; Sternberg, 2006). Consequently, part of the studies has defended the idea that the differences between men and women in this construct, when they appear, should be conceptualized as contextual. As a result, it can be susceptible to the influence of a wide range of variables that cannot be disregarded (Kemmlmeier & Walton, 2016), such as environmental, social, and cultural factors (Prado et al., 2016).

FINAL CONSIDERATIONS

The investigation of possible gender differences in creativity has proved to be a challenging theme for psychology, and it is important to highlight the contribution from this study. By analyzing Brazilian and international articles, unlike other reviews found, a broader picture of how the theme has been investigated is traced, expanding existing knowledge.

One differential perspective is added to the present study, which addresses the issue of gender differences from an angle that has not been usually worked on in research on the subject: the insertion of a category that considers the possibility of oscillation of results depending on the content, within a fourth strand (among the three most commonly used: absence of differences between genders, better performance obtained by women and better performance by men).

On the other hand, a series of other studies are suggested and involve, for example, overcoming some of the limitations of the search performed: the expansion and extension of the search to other databases, as well as the inclusion of data obtained through dissertations, master's degrees, doctoral theses and book chapters related to the topic. Also noteworthy is the fact that the review deals with only a part of all the number of publications on the theme, since several relevant bases were not included in the research.

Despite the results, it is important to note that creativity should be valued in different contexts and encouraged in all individuals, regardless of gender, age or other sociodemographic characteristics. Only in this way it can be explored as a potential present in all individuals in order to favor personal and professional self-realization.

REFERENCES

- Abraham, A. (2016). Gender and creativity: An overview of psychological and neuroscientific literature. *Brain Imaging and Behavior*, 10, 609-618. <http://doi.org/10.1007/s11682-015-9410-8>
- Abraham, A., Thybusch, K., Pieritz, K., & Hermann, C. (2014). Gender differences in creative thinking: Behavioral and fMRI findings. *Brain Imaging and Behavior*, 8, 39-51. <https://doi.org/10.1007/s11682-013-9241-4>
- Ai, X. (1999). Creativity and academic achievement: An Investigation of Gender Differences. *Creativity Research Journal*, 12(4), 329-337. https://doi.org/10.1207/s15326934crj1204_11
- Alencar, E. M. L. S. (1975). Efeitos de um programa de treinamento de criatividade em alunos de 4ª e 5ª séries. *Arquivos Brasileiros de Psicologia Aplicada*, 27 (4), 3-15. <http://bibliotecadigital.fgv.br/ojs/index.php/abpa/article/view/17533/16278>

- Alencar, E. M. L. S. (1997). O estímulo à criatividade no contexto universitário. *Psicologia Escolar e Educacional*, 1(2/3), 29-37. <http://pepsic.bvsalud.org/pdf/pee/v1n2-3/v1n2-3a04.pdf>
- Almeida, L., Nogueira, S. I., Jesus, A. L., & Mimoso, T. (2013). Valores e criatividade em trabalhadores portugueses. *Estudos de Psicologia (Campinas)*, 30(3), 425-435. <http://dx.doi.org/10.1590/S0103-166X2013000300012>
- Aluja-Fabregat, A., Colom, R., Abad, F., & Juan-Espinosa, M. (2000). Sex differences in general intelligence defined as g among young adolescents. *Personality and Individual Differences*, 28(4), 813-820. [https://doi.org/10.1016/s0191-8869\(99\)00142-7](https://doi.org/10.1016/s0191-8869(99)00142-7)
- Aranha, M. A. R. C. (1997). Creativity in students and its relation to intelligence and peer perception. *Interamerican Journal of Psychology*, 31(2), 309-313. <https://dialnet.unirioja.es/servlet/articulo?codigo=3852750>
- Baer, J. (1999). Gender Differences. In M. A. Runco & S. R. Pritzker (Orgs.), *Encyclopedia of Creativity* (pp. 753-758). Academic Press.
- Baer, J. & Kaufman, J. C. (2008). Gender differences in creativity. *The Journal of Creative Behavior*, 42(2), 75-105. <https://doi.org/10.1002/j.2162-6057.2008.tb01289.x>
- Baquedano, M. T. S. A., & Lizarraga, M. L. S. A. (2012). A correlational and predictive study of creativity and personality of college students. *The Spanish Journal of Psychology*, 15(3), 1081-1088. http://dx.doi.org/10.5209/rev_SJOP.2012.v15.n3.39398
- Bart, W. M., Hokanson, B., Sahin, I., & Abdelsamea, M. A. (2015). An investigation of the gender differences in creative thinking abilities among 8th and 11th grade students. *Thinking Skills and Creativity*, 17, 17-24. <http://dx.doi.org/10.1016/j.tsc.2015.03.003>
- Beghetto, R. A., Kaufman, J. C., & Baxter, J. (2011). Answering the unexpected questions: Exploring the relationship between students' creative self-efficacy and teacher ratings of creativity. *Psychology of Aesthetics, Creativity, and the Arts*, 5(4), 342-349. <https://doi.org/10.1037/a0022834>
- Candeias, A. A. (2008). Criatividade: Perspectiva integrativa sobre o conceito e a sua avaliação. In M. F. Morais & S. Bahia (Orgs.), *Criatividade: Conceito, necessidades e intervenção* (pp. 41-64). Psiquilíbrios.
- Cavalcanti, M. M. P. (2009). *A relação entre motivação para aprender, percepção do clima de sala de aula para criatividade e desempenho escolar de alunos do 5º ano do ensino fundamental* [Dissertação de mestrado, Universidade de Brasília]. <http://repositorio.unb.br/handle/10482/4399>
- Chae, S. (2003). Adaptation of a picture-type creativity test for preschool children. *Language Testing*, 20(2), 179-188. <https://doi.org/10.1191/0265532203lt251oa>
- Chen, C., Kasof, J., Himsel, A. J., Greenberger, E., Dong, Q., & Xue, G. (2002). Creativity in drawings of geometric shapes: A cross-cultural examination with the consensual assessment technique. *Journal of Cross-Cultural Psychology*, 33(2), 171-187. <https://doi.org/10.1177/0022022102033002004>
- Cheung, P. C., & Lau, S. (2013). A tale of two generations: Creativity growth and gender differences over a period of education and curriculum reforms. *Creativity Research Journal*, 25(4), 463-471. <https://doi.org/10.1080/10400419.2013.843916>
- Colom, R., Juan-Espinosa, M., Abad, F., & García, L. F. (2000). Negligible sex differences in general intelligence. *Intelligence*, 28(1), 57-68. [https://doi.org/10.1016/s0160-2896\(99\)00035-5](https://doi.org/10.1016/s0160-2896(99)00035-5)
- De La Torre, S. (2005). *Dialogando com a criatividade*. Madras.
- Dikici, A. (2014). Relationships between thinking styles and behaviors fostering creativity: An exploratory study for the mediating role of certain demographic traits. *Educational Sciences: Theory & Practice*, 14(1), 179-201. <http://doi.org/10.12738/estp.2014.1.1939>
- Dudek, S. Z., Strobel, M. G., & Runco, M. A. (1993). Cumulative and proximal influences on the social environment and children's creative potential. *The Journal of Genetic Psychology*, 154(4), 487-499. <https://doi.org/10.1080/00221325.1993.9914747>
- Eisler, R., Donnelly, G., & Montuori, A. (2016). Creativity, society, and gender: Contextualizing and redefining creativity. *Interdisciplinary Journal of Partnership Studies*, 3(2). https://www.academia.edu/26021761/Creativity_Society_and_Gender_Contextualizing_and_Redefining_Creativity
- Sousa Filho, P. G., & Alencar, E. M. L. S. (2003). Habilidades de pensamento criativo em crianças institucionalizadas e não institucionalizadas. *Estudos de Psicologia (Campinas)*, 20(3), 23-35. <https://doi.org/10.1590/s0103-166x2003000300002>
- Fleith, D. S., & Alencar, E. M. L. S. (2006). Percepção de alunos do ensino fundamental quanto ao clima de sala de aula para criatividade. *Psicologia em Estudo*, 11(3), 513-521. <https://doi.org/10.1590/s1413-73722006000300007>
- Fleith, D. S., & Alencar, E. M. L. S. (2008). Características psicológicas e fatores ambientais relacionados à criatividade do aluno do Ensino Fundamental. *Avaliação Psicológica*, 7(1), 35-44. <http://pepsic.bvsalud.org/pdf/avp/v7n1/v7n1a06.pdf>
- Fleith, D. S., & Alencar, E. M. L. S. (2012). Autoconceito e Clima Criativo em Sala de Aula na percepção de alunos do ensino fundamental. *Psico-USF*, 17(2), 195-203. <https://doi.org/10.1590/s1413-82712012000200003>
- Garaigordobil, M., & Berruoco, L. (2011). Effects of a play program on creative thinking of preschool children. *The Spanish Journal of Psychology*, 14(2), 608-618. https://doi.org/10.5209/rev_sjop.2011.v14.n2.9
- Ghayas, S., Akhter, S., & Adil, A. (2012). Impact of gender and subject on the creativity level of high and low achievers. *Journal of the Indian Academy of Applied Psychology*, 39(1), 150-156. https://www.researchgate.net/publication/233529442_Impact_of_Gender_and_Subject_on_the_Creativity_Level_of_High_and_Low_Achievers
- Gontijo, C. H., & Fleith, D. S. (2009). Motivação e criatividade em matemática: Um estudo comparativo entre alunas e alunos do ensino médio. *ETD – Educação Temática Digital*, 10, 147-167. <http://dx.doi.org/10.20396/etd.v10in.esp..939>
- Gralewski, J., & Karwowski, M. (2013). Polite girls and creative boys? Student's gender moderates accuracy of teacher's ratings of creativity. *The Journal of Creative Behavior*, 47(4), 290-304. <http://doi.org/10.1002/jocb.36>
- He, W. & Wong, W. (2011). Gender differences in creative thinking revisited: Findings from analysis of variability. *Personality and Individual Differences*, 51(7), 807-811. <https://doi.org/10.1016/j.paid.2011.06.027>
- Horner, M. S. (1972). Toward an understanding of achievement-related conflicts in women. *Journal of Social Issues*, 28(2), 157-175. <http://doi.org/10.1111/j.1540-4560.1972.tb00023.x>
- Kaufman, J. C., Niu, W., Sexton, J. D., & Cole, J. C. (2010). In the eye of the beholder: Differences across ethnicity and gender in evaluating creative work. *Journal of Applied Social Psychology*, 40(2), 496-511. <https://doi.org/10.1111/j.1559-1816.2009.00584.x>
- Kemmelmeier, M., & Walton, A. P. (2016). Creativity in men and women: Threat, other-interest, and self-assessment. *Creativity Research Journal*, 28(1), 78-88. <https://doi.org/10.1080/10400419.2016.1125266>
- Kemmelmeier, M., & Walton, A. P. (2012). Creativity in its social context: The interplay of organizational norms, situational threat, and gender. *Creativity Research Journal*, 24(2-3), 208-219. <http://dx.doi.org/10.1080/10400419.2012.677345>
- Kiehn, M. T. (2003). Development of music creativity among elementary school students. *Journal of Research in Music Education*, 51(4), 278-288. <https://doi.org/10.2307/3345655>

- Kim, J., & Michael, W. B. (1995). The relationship of creativity measures to school achievement and to preferred learning and thinking style in a sample of Korean high school students. *Educational and Psychological Measurement, 55*(1), 60-74. <https://doi.org/10.1177/0013164495055001006>
- Kousoulas, F. (2010). The interplay of Creative Behavior, Divergent Thinking, and Knowledge Base in students' creative expression during learning activity. *Creativity Research Journal, 22*(4), 387-396. <https://doi.org/10.1080/10400419.2010.523404>
- Krumm, G., Lemos, V., & Filippetti, V. A. (2014). Factor structure of the Torrance Tests of Creative Thinking Figural Form B in Spanish-speaking children: Measurement invariance across gender. *Creativity Research Journal, 26*(1), 72-81. <http://doi.org/10.1080/10400419.2013.843908>
- Lau, S., & Cheung, P. C. (2015). A gender-fair look at variability in creativity: Growth in variability over a period versus gender comparison at a time point. *Creativity Research Journal, 27*(1), 87-95. <http://doi.org/10.1080/10400419.2015.992685>
- Leu, Y., & Chiu, M. (2015). Creative behaviours in mathematics: Relationships with abilities, demographics, affects and gifted behaviours. *Thinking Skills and Creativity, 16*, 40-50. <http://dx.doi.org/10.1016/j.tsc.2015.01.001>
- Lin, S., & Wong, C. S. (2014). The creativity level of Taiwan hospitality undergraduate students. *Procedia – Social and Behavioral Sciences, 144*, 54-59. <http://doi.org/10.1016/j.sbspro.2014.07.273>
- Lynn, R. (1994). Sex differences in intelligence and brain size: A paradox resolved. *Personality and Individual Differences, 17*(2), 257-271. [https://doi.org/10.1016/0191-8869\(94\)90030-2](https://doi.org/10.1016/0191-8869(94)90030-2)
- Madjar, N., Greenberg, E., & Chen, Z. (2011). Factors for radical creativity, incremental creativity, and routine, noncreative performance. *Journal of Applied Psychology, 96*(4), 730-743. <https://doi.org/10.1037/a0022416>
- Matos, D. R., & Fleith, D. S. (2006). Criatividade e clima criativo entre alunos de escolas abertas, intermediárias e tradicionais. *Psicologia Escolar e Educacional, 10*(1), 109-120. <http://dx.doi.org/10.1590/S1413-85572006000100010>
- Matud, M. P., Rodríguez, C., & Grande, J. (2007). Gender differences in creative thinking. *Personality and Individual Differences, 43*(5), 1137-1147. <https://doi.org/10.1016/j.paid.2007.03.006>
- Mendonça, P. V. C. F., & Fleith, D. S. (2005). Relação entre criatividade, inteligência e autoconceito em alunos monolíngues e bilingües. *Psicologia Escolar e Educacional, 9*(1), 59-70. <https://doi.org/10.1590/s1413-85572005000100006>
- Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *PLoS Med, 6*(7), e1000097. <http://doi.org/10.1371/journal.pmed.1000097>
- Montuori, A., & Purser, R. E. (1995). Deconstructing the lone genius myth: Toward a contextual view of creativity. *Journal of Humanistic Psychology, 35*(3), 69-112. <http://doi.org/10.1177/00221678950353005>
- Morais, M. F., & Almeida, L. S. (2019). "I would be more creative if...": Are there perceived barriers to college students' creative expression according to gender? *Estudos de Psicologia (Campinas), 36*, e180011. <http://dx.doi.org/10.1590/1982-0275201936e180011>
- Nakano, T. C. (2006). *Teste brasileiro de criatividade infantil – normatização de instrumento no ensino fundamental* [Tese de doutorado, Pontifícia Universidade Católica de Campinas]. Biblioteca digital de teses e dissertações da Puc-Campinas. <http://tede.bibliotecadigital.puc-campinas.edu.br:8080/jspui/handle/tede/371>
- Nakano, T. C. (2012). Criatividade e inteligência em crianças: Habilidades relacionadas? *Psicologia: Teoria e Pesquisa, 28*(2), 149-160. <https://doi.org/10.1590/s0102-37722012000200003>
- Nakano, T. C., & Brito, M. E. (2013). Avaliação da criatividade a partir do controle do nível de inteligência em uma amostra de crianças. *Temas em Psicologia, 21*(1), 1-15. <https://doi.org/10.9788/tp2013.1-01>
- Nakano, T. C., Campos, C. R., Silva, T. F., & Pereira, E. K. G. (2011). Estilos de pensar e criar no contexto organizacional: Diferenças de acordo com o cargo profissional? *Estudos Interdisciplinares em Psicologia, 2*(2), 171-193. <http://dx.doi.org/10.5433/2236-6407.2011v2n2p171>
- Nakano, T. C., & Castro, L. R. (2013). Relação entre criatividade e traços temperamentais em estudantes do ensino fundamental. *Psico-USF, 18*(2), 249-261. <https://doi.org/10.1590/s1413-82712013000200009>
- Nakano, T. C., Santos, E., Zavariz, S. F., Wechsler, S. M., & Martins, E. (2010). Estilos de pensar e criar em universitários das áreas de humanas e sociais aplicadas: Diferenças por gênero e curso. *Psicologia: Teoria e Prática, 12*(3), 120-134. http://pepsic.bvsalud.org/scielo.php?script=sci_arttext&pid=S1516-36872010000300010
- Nakano, T. C., & Wechsler, S. M. (2006). Teste Brasileiro de Criatividade Figural: Proposta de instrumento. *Revista Interamericana de Psicologia, 40*(1), 103-110. http://pepsic.bvsalud.org/scielo.php?script=sci_arttext&pid=S0034-96902006000100011
- Nakano, T. C., & Wechsler, S. M. (2012). Criatividade: Definições, modelos e formas de avaliação. In C. S. Hutz (Org.), *Avanços em avaliação psicológica de crianças e adolescentes II* (pp. 327-361). Casa do Psicólogo.
- Odzimir, N. N., & Sak, U. (2013). Componential analysis of gender differences in scientific creativity. *Turkish Journal of Giftedness and Education, 3*(2), 53-65. <https://core.ac.uk/display/26944954>
- Osborn, A. F. (1975). *O poder criador da mente: Princípios e processos do pensamento criador e do brainstorming*. Ibrasa.
- Phipps, S. T. A., & Prieto, L. C. (2015). Women versus men in entrepreneurship: A comparison of the sexes on creativity, political skill, and entrepreneurial intentions. *Academy of Entrepreneurship Journal, 21*(1), 32-43. https://www.researchgate.net/publication/281927490_Women_versus_men_in_entrepreneurship_A_comparison_of_the_sexes_on_creativity_political_skill_and_entrepreneurial_intentions
- Plucker, J. A., Guo, J., & Makel, M. (2018). Creativity. In S. I. Pfeiffer (Ed.), *Handbook of Giftedness in Children* (pp. 81-99). Springer.
- Prado, R. M., Alencar, E. M. L. S., & Fleith, D. S. (2016). Diferenças de gênero em criatividade: Análise das pesquisas brasileiras. *Boletim de Psicologia, LXVII*(144), 113-124. <http://pepsic.bvsalud.org/pdf/bolpsi/v66n144/v66n144a10.pdf>
- Raels, A. R., Bahrami, S., & Yousefi, M. (2013). Relationship between information literacy and creativity: A study of students at the Isfahan University of Medical Sciences. *Materia Socio Medica, 25*(1), 28-31. <http://doi.org/10.5455/msm.2013.25.28-31>
- Rejskind, F. G., Rapagna, S. O., & Gold, D. (1992). Gender differences in children's divergent thinking. *Creativity Research Journal, 5*(2), 165-174. <https://doi.org/10.1080/10400419209534430>
- Romo, M. (2018). Tiene género la creatividad? Obstáculos a la excelencia en mujeres. *Estudios de Psicologia (Campinas), 35*(3), 247-258. <http://dx.doi.org/10.1590/1982-02752018000300003>
- Rosa, J. A., Qualls, W. J., & Ruth, J. A. (2014). Consumer creativity: Effects of gender and variation in the richness of vision and touch inputs. *Journal of Business Research, 67*(3), 386-393. <http://dx.doi.org/10.1016/j.jbusres.2012.12.023>
- Runco M. A., Cramond B., Pagnani A. R. (2010). Gender and Creativity. In J. Chrisler & D. McCreary (Eds.), *Handbook of Gender Research in Psychology* (pp. 343-357). Springer. https://doi.org/10.1007/978-1-4419-1465-1_17

- Runco, M. A., Millar, G., Acar, S., & Cramond, B. (2010b). Torrance tests of creative thinking as predictors of personal and public achievement: A fifty-year follow-up. *Creativity Research Journal*, 22(4), 361-368. <https://doi.org/10.1080/10400419.2010.523393>
- Sayed, E. M., & Mohamed, A. H. H. (2013). Gender differences in Divergent Thinking: Use of the Test of Creative Thinking-Drawing Production on an Egyptian sample. *Creativity Research Journal*, 25(2), 222-227. <http://doi.org/10.1080/10400419.2013.783760>
- Sternberg, R. J. (2006). Creating a vision of creativity: The first 25 years. *Psychology of Aesthetics, Creativity, and the Arts*, 5(1), 2-12. <https://doi.org/10.1037/1931-3896.s1.2>
- Stoltzfus, G., Nibbelink, B. L., Vrendenburg, D., & Hyrum, E. (2011). Gender, gender role and creativity. *Social Behavior and Personality: an international journal*, 39(3), 425-432. <https://doi.org/10.2224/sbp.2011.39.3.425>
- Suárez, J. T., & Wechsler, S. M. (2019). Identificação de talento criativo e intelectual na sala de aula. *Psicologia Escolar e Educacional*, 23, e192483. <http://dx.doi.org/10.1590/2175-35392019012483>
- Tentes, V. T. A. (2011). *Superdotados e Superdotados Underachivers: Um estudo comparativo das características pessoais, familiares e escolares* [Dissertação de mestrado, Universidade de Brasília]. <https://repositorio.unb.br/handle/10482/8825>
- Torrance, E. P. (1974). *Norms-technical manual Torrance Tests of Creative Thinking: Verbal Tests, Forms A and B, Figural Tests, Form A and B*. Ginn and Company.
- Torrance, E. P. (1990). *Torrance tests of creative thinking*. Scholastic Testing Service.
- Tsai, K. C. (2013). Examining gender differences in creativity. *The International Journal of Social Sciences*, 13(1), 115-122. <http://www.tijoss.com/TIJOSS%2013th%20Volume/Tsai%20Kuan%20Chen.pdf>
- Tsai, K. C. (2014). An exploratory study of investigating the creative potential of Taiwanese children. *Journal of Educational Health and Community Psychology*, 3(1), 6-17. https://www.researchgate.net/publication/283083651_An_Exploratory_Study_of_Investigating_the_Creative_Potential_of_Taiwanese_Children
- Virgolin, A. M. R., & Alencar, E. M. L. S. (1993). Habilidades de pensamento criativo entre alunos de escolas abertas, intermediárias e tradicionais. *Psicologia: Teoria e Pesquisa*, 9(3), 601-610. <https://pesquisa.bvsalud.org/portal/resource/pt/lil-143622>
- Wai, J. (2013). Investigating America's elite: Cognitive ability, education, and sex differences. *Intelligence*, 41(4), 203-211. <http://dx.doi.org/10.1016/j.intell.2013.03.005>
- Wechsler, S. M. (1987). Efeitos do treinamento em criatividade em crianças bem dotadas e regulares. *Arquivos Brasileiro de Psicologia*, 39(4), 95-110. <http://bibliotecadigital.fgv.br/ojs/index.php/abp/article/view/20253>
- Wechsler, S. M., Nunes, M. F. O., Schelini, P. W., Ferreira, A. A., & Pereira, D. A. P. (2010). Criatividade e Inteligência: Analisando semelhanças e discrepâncias no desenvolvimento. *Estudos de Psicologia (Natal)*, 15(3), 243-250. <https://doi.org/10.1590/s1413-294x2010000300003>
- Xiong, Y., Li, Y., Chen, Y., Yuan, P., Fan, Y., & Jiang, W. (2015). The creative investigation of brain activity with EEG for gender and left/right-handed differences. *Journal of Mechanics in Medicine and Biology*, 15(4), 1-12. <https://doi.org/10.1142/s0219519415500542>