

Physical activity according to gender in Brazilian Physical Education textbooks Actividad Física en función del género en los libros de texto de Educación Física brasileños

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Abstract. One of the purposes of Physical Education is promoting physical activity through equal opportunities for boys and girls, accepting diversity. Aware of the power of the image for the reproduction of gender stereotypes, this research aimed to analyse its existence in Brazilian textbooks. The study was empirical, descriptive and comparative among analysed books that used content analysis and inferential statistics. The sample comprised 1327 images. These images concerned 10 Physical Education textbooks published by four Brazilian publishers who edited them as teacher's guides for primary education between 2017 and 2018. A content analysis was carried out through the adaptation of the SAIMEF tool. The classification and categorization of the images were performed by five expert judges, using, as a criterion, the coefficient of agreement between them. The results indicated greater importance of images linked to the male gender, with a predominance of sports and fights as main activities, while the female gender is characterized by individual practices, such as gymnastics. The study concluded that Physical Education guides in Brazil convey a sports educational model, which can influence the choice of body practices and consolidate students' imagination based on hegemonic standards present in society. Therefore, teachers need to make a critical analysis of these images to avoid promoting this hegemonic male sports model among primary and secondary school students in their physical education classes.

Keywords: textbook; gender, physical education, content analyses, Brazil.

Resumen. Uno de los fines de la Educación Física es la promoción de la actividad física a través de la igualdad de oportunidades entre niños y niñas, aceptando la diversidad. Consciente del poder de la imagen para la reproducción de estereotipos de género, esta investigación tuvo como objetivo analizar su existencia en los libros de texto brasileños. El estudio fue empírico, descriptivo y comparativo entre los libros analizados que utilizaron análisis de contenido y estadística inferencial. La muestra estuvo compuesta por 1327 imágenes. Esas imágenes se referían a 10 libros de texto de Educación Física, publicados por cuatro editoriales brasileñas que habían editado esos textos como guías para profesores de educación primaria entre 2017 y 2018. Se realizó un análisis de contenido a través de la adaptación de la herramienta SAIMEF. La clasificación y categorización de las imágenes fue realizada por cinco jueces expertos, utilizando como criterio el coeficiente de concordancia entre ellos. Los resultados indicaron una mayor importancia de las imágenes vinculadas al género masculino, predominando los deportes y las luchas como actividades principales, mientras que el género femenino se caracteriza por prácticas individuales, como la gimnasia. El estudio concluyó que los libros de texto de Educación Física en Brasil transmiten un modelo educativo deportivo, que puede influir en la elección de prácticas corporales y consolidar la imaginación de los estudiantes a partir de patrones hegemónicos presentes en la sociedad. Por lo tanto, los docentes deben hacer un análisis crítico de estas imágenes para evitar promover este modelo deportivo masculino hegemónico entre los estudiantes de primaria y secundaria en sus clases de Educación Física.

Palabras clave: libros de texto, género, educación física, análisis de contenido, Brasil.

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Introduction

The textbook is a material that is constantly criticized by education specialists due to the ideology conveyed in its content and, sometimes, because it is the only resource used by teachers in the teaching and learning process, without which they hardly teach, generating a passive posture, even though it is an overvalued didactic-pedagogical instrument in school culture (Silva, 2012). However, one must reflect on its use, as an important pedagogical instrument for the teacher, according to the content to be developed (Darido et al., 2010).

Within these didactic-pedagogical materials, images perform various roles, such as reading orientation, description of contents, and the relationship between the levels of explanation. In addition to helping with curricular organization, they can configure multiple possibilities of body representation and power relations, thus requiring an interdisciplinary and contextualized analysis approach.

This means that the images used in school textbooks

can carry evaluations that negatively show a person, event, social group, etc., producing prejudices, discrimination, and stereotypes, which can underlie certain ideological orientations that penetrate the collective consciousness of students when these images are presented without prior reflection. Thus, it is essential to analyze this material and its hidden curriculum (Devís et al., 2005).

Among the various elements of analysis that we find in the images of Physical Education textbooks, the relationship between gender and physical activity stands out. We proposed, as the objective of this research, to verify the existence/absence of gender stereotypes in the images of textbooks of Physical Education in Brazil (Teacher's Guide) intended for primary school teachers.

National Brazilian Textbook Program

The textbook has been in school culture since the modern school (19th century). It is conceived as a pedagogical resource that optimizes the teaching and learning process. At that time, the costs for the production of this

type of material in Brazil were high, and the imperial press could not meet the demand for publication of didactic texts (Silva, 2012).

Traditionally, in Brazil, the curricular component of Physical Education did not have textbooks; thus, it is still a little used and investigated material. According to Amaral et al. (2021), research on textbooks in the field of Physical Education is relevant due to the importance they assume in the pedagogical practice and the scarcity of literature in the area.

Conceptual issues in dealing with the specific contents of Physical Education advanced, culminating in the development of textbooks for teachers and students, as identified in some state curriculum proposals: Rio Grande do Sul (2009), São Paulo (2008), and Paraná (2008).

The academic production involving the theme of textbooks for Physical Education at school has shown that the use of this pedagogical resource, throughout the history of this curricular component in Brazil, is recent, with the first record found dating from 1993 (Loureiro & Moreira, 2020). In this context, Souza Júnior et al. (2015) sought to identify, through literature analysis, factors that contributed to the existing gap between Physical Education and textbooks, concluding that the historical legacy of the area has been one of the main drivers of this gap. On the other hand, we understand that this panorama begins to be minimized by recent initiatives of elaboration, discussion, and the use of textbooks in the area.

With the approval of the National Curricular Common Base (BNCC) (Brazil 2018a), the organic and progressive set of essential learning that all students must develop throughout the stages and modalities of primary education was defined, to ensure their rights to learning and development, in accordance with the National Education Plan (PNE).

In line with the BNCC, the National Textbook and Teaching Material Program (PNLD) was released (Decree no. 9099, of July 18, 2017) by the Primary Education Secretariat (SEB). It is a book distribution program – an educational policy linked to the National Fund for the Development of Education (FNDE), aimed at evaluating and making available didactic, pedagogical, and literary works, among other materials, to support the educational practice in a systematic, regular, and freeway in Brazilian schools.

Between the end of 2019 and the beginning of 2020, millions of textbooks were distributed to serve students and teachers throughout the country's primary education. From kindergarten to secondary education, 172,571,931 copies were distributed (FNDE/MEC 2022).

The area of Physical Education was included for the first time in the PNLD, with guides from the following publishers approved in 2018: Boreal, FTD, Moderna, and Terra Sul. For the development of this study, we used these guides aimed at Physical Education teachers, organized in volume 1 (1st and 2nd grade) and volume 2 (3rd to 5th grade). Subsequently, of registration and evaluation

process of didactic and literary works for the PNLD 2020 (Brasil, 2018b), resulted in the approval of two more books by the publishers Moderna and Terra Sul. Each produced a Physical Education Teacher's Guide in a single volume, intended for grades 6 to 9.

Studies on textbooks in the Brazilian context

Recent studies have identified, with Physical Education teachers, the possibilities/difficulties of using the textbook in the pedagogical practice, as well as the involvement of students during activities structured by this type of material. Barroso and Darido (2017) state that teachers are in favor of using the textbook, as long as they have the autonomy to make changes to the material.

We identified that none of the teachers participating in the study had experience in the use of textbooks. Still, we observed that they were favored of using this type of material as a teaching tool to assist the pedagogical practice, as also mentioned in a previous study (Barroso & Darido, 2016). Regarding students, it was possible to identify initial resistance to the use of the textbook, with better acceptance in carrying out brief tasks.

Silva et al. (2020) analysed the PNLD in the context of primary education of the Physical Education curricular component, using the literature analysis (articles, books, and documents) covering the period from 2014 to 2019. They also found that research on the subject, as well as its relationship with the BNCC, is embryonic.

However, the concern to investigate the subject has increased in recent decades in the Brazilian context. There is a growing interest in research on textbook use and reception (Chopin, 2004). In the case of the Physical Education area, the motivation stems mainly from the unprecedented insertion of the Teacher's Guide in the PNLD, in 2019.

Recent academic productions about the Physical Education textbook highlight the hope and fears present in this type of material, emphasizing a set of works classified as: explorers of the textbook's potential, content analysts, public policies, and understanding researchers (Melo & Moreira, 2019).

At the same time, the textbook coexists in the school with numerous other artifacts: audiovisual material (films and music), maps, educational software, and the internet (Puchta & Oliveira, 2015). This indicates that to use the textbook, teachers need to re-signify their pedagogical practice proposal, resuming their experiences with the curricular component. It is possible to didactically organize one's planning and experiences and build one's own didactic material articulating knowledge and digital language codes that can contribute to the teaching and learning of Physical Education (Oliveira Neto, 2021).

Research on gender and physical activity in Physical Education textbooks

The expressions of gender inequality in Physical Education classes in school were observed by Uchoga and Altmann (2016). The analysis indicates that boys and girls

deal in a different way in learning new movements and practices. Also, conclude that boys used to risk more and seemed more self-confident during activities. Studies have shown that the hegemonic perspective of Physical Education reproduces social inequalities in general, making inequality and women's oppression deeper (Frizzo et al., 2018). Sometimes, these students' experiences are marked by a process of gender inequality, which is strengthened by the absence of teacher's intervention (Silva, 2021).

Studies focusing on the analysis of Physical Education textbooks have increased considerably in the last decade on different aspects. Particularly in the context of Sweden, research was carried out focusing on the discourse of printed curriculum materials (Alsarve, 2022; Munksvendsen & Tinggaard-Svendsen, 2016) and on the images contained in the texts (González-Palomares & Rey-Cao, 2020; Moya-Mata, 2020).

In the Swedish context, hegemonic masculinity is clearly identified in textbooks as an obstacle to gender equality, and they consider them as powerful documents that build and maintain contradictory discourses about the value and practice of Physical Education.

From the studies carried out in Spain related to the visual hidden curriculum in Physical Education textbooks (Riera & Moya-Mata, 2021). In all of them, it was identified that the male gender is more represented than the female one in physical activities, sports, and activities in nature, mainly relegating to the female figure the activities of the body and rhythmic expression.

Specifically in Brazil, the analysis of school Physical Education textbooks is very scarce (Botelho & Neira, 2014). In this context, research on textbooks regarding gender has focused on two studies (González-Palomares et al., 2015; Loro et al., 2021).

In the study by González-Palomares et al. (2015), based on the analysis of 929 photographs belonging to 36 textbooks intended for primary and secondary school students published between 2006 and 2012 in Brazil, the researchers observed that the male representation (38.6%) was more frequent, followed by mixed groups (35.2%) and female gender (26.2%). With regard to the relationship between the type of body practice represented in the images and the subjects' gender, the authors observed that collective and individual sports are represented by exclusively male and females images in physical conditioning activities.

In the study by Loro et al. (2021), on the diversity of images of Physical Education teacher guides in Brazil, of the 854 images analysed by four publishers, mixed group images predominated (48.5%), followed by male (30.7%) and female (20.8%) representation.

In this line of research, countries such as Spain have resorted to studies on image analysis in Physical Education textbooks. We found similar research on gender stereotypes both in primary education (Moya et al., 2013; Moya-Mata et al., 2019) and in secondary education (González-Palomares et al., 2017; Táboas-Pais & Rey-Cao, 2012).

In the analysis of primary school textbooks, Moya et al. (2013) found that the most represented subjects were male (39.52%). In addition, the authors identified the following predominated: the male figure in physical and sports fitness activities (both collective and individual); the female figure in complementary activities and coordination skills; and mixed groups in primary skills, games, and artistic performances.

In the study by Moya-Mata et al. (2019) on the representation of adventure practices in the natural environment according to gender, we found that the most represented gender in the images was male (40.4%), followed by female (27.3%) and mixed groups (21.2%). Specifically, the results showed that the activities in the natural environment were carried out by men, belonging to the childhood age group, who practice mountain sports, namely orienteering. However, female images, mainly represented by girls, consisted of mountain sports, such as climbing, and the aquatic environment.

In the analysis of Physical Education textbooks for secondary education, the research by Táboas-Pais and Rey-Cao (2012) revealed that almost half of the published photographs (49.49%) consisted exclusively of men, who perform sports (especially collective) and elite sports. Less representative were female images, in which subjects practiced other non-sports physical activities, such as fitness or artistic practices, in non-elitist environments.

The results of the investigation by González-Palomares et al. (2017), based on the analysis of 5,972 photographs belonging to 39 Spanish Physical Education textbooks, show that the images reproduce a differentiated body culture according to gender. The feminine has been characterized by the practice of individual sports, artistic activities, interiorization practices, and physical conditioning work, in informal and utilitarian environments, indoor spaces and at levels of practice far from high performance. On the contrary, the masculine body culture present in the images has been expressed by the practice of sports (both collective and individual), in competitive environments, outdoor spaces, and in levels of practice linked to the sport's elite.

Aware of the power of images for the reproduction of gender stereotypes to our students, based on the conclusions of the aforementioned studies, we proposed, as an objective of this research: to verify the existence or absence of gender stereotypes in the images of Physical Education textbooks for primary education in Brazil, formulating six hypotheses:

(1) Male representation occurs more frequently than female representation in the images of Physical Education textbooks for primary education in Brazil.

(2) The most represented thematic unit is sports, in front of games and play, gymnastics, dance, wrestle, and adventure practice.

(3) The sports practice is carried out mainly in an elit-

(3) The sports practice is carried out mainly in an elit-

ist environment, oriented towards maximum performance and competitiveness.

(4) Female representation is related to the thematic units of dance and gymnastics; while male representation is characterized by the practice of sports, wrestle, and adventure practices.

(5) Female representation is related to individual sports, while male representation is characterized by collective sports.

(6) Male representation appears more often in elite sports than female representation.

Material and Methods

This is mixed-method research that used content analysis (Neuendorf, 2017), descriptive statistics (Holcomb, 2016), and inferential statistics (Casella & Berger, 2021), considering the frequency distribution of the images contained in ten Physical Education guides produced by the four publishers approved in the National Textbook and Teaching Material Program (PNLD) (Brazil, 2017).

Sample

The analysed sample comprised 1,327 images identified in textbooks. In total, 10 textbooks were analysed. These books correspond to the teacher's guides: volumes 1 and 2 are intended for the early years of primary education, and volume 3 for the final years of the cycle. Table 1 indicates the frequency distribution of these images by publisher and investigated volumes between 2017 and 2018.

Table 1.
Guides selected to sample images

Publisher	Year	Title	Images
Terra Sul	2017	Manual do Professor para a Educação Física (v. 1)	101
	2017	Manual do Professor para a Educação Física (v. 2)	229
	2018	Manual do Professor para a Educação Física (v. 3)	252
Boreal	2017	Práticas Corporais e a Educação Física Escolar (v. 1)	75
	2017	Práticas Corporais e a Educação Física Escolar (v. 2)	53
FTD	2018	Encontros Educação Física (v. 1)	65
	2018	Encontros Educação Física (v. 2)	100
Moderna	2017	Práticas Corporais – Educação Física (v. 1)	92
	2017	Práticas Corporais – Educação Física (v. 2)	146
	2018	Práticas Corporais – Educação Física (v. 3)	215
Total			1,327

Study variables and mode of analysis

The classification and categorization of the images were performed by five expert judges, using, as a criterion, the coefficient of agreement between them (Hernández-Nieto, 2002; Polit & Beck, 2006). For the election of the judges, they must meet the following requirements: 1) Possess a Degree in Physical Activity and Sports Sciences, 2) Minimum experience of 10 years in school or university Physical Education, 3) Participation in observational methodology research, 4) Experience with illustrated

images, and 5) Having publications on the subject. To do so, we start from the system of categories of the SAIMEF tool, for the analysis of images printed in Physical Education textbooks in Spain (Moya-Mata et al., 2018) and their adaptation to the Brazilian educational context (Loro et al., 2021), modeled *ad hoc*.

Thus, initially, we performed a content analysis of the sampled images and then proceeded to the categorization process, which followed the logic established in Chart 1, in which we assumed three dimensions for the images, resulting in eight categories and indicators that varied according to each of them.

In view of the findings and the breadth of this categorization, we chose, in this study, to analyse the variables: gender-grouping – condition that establishes differences between men (male), women (female), and groups of men-women (mixed); thematic unit – the different blocks of content for physical activities and/or sports; and level of dedication – elite and/or non-elite (Table 2).

Table 2.
Image categorization system used in the investigation

DIMENSIONS	CATEGORIES	INDICATORS
1 Features of the image	1.1 Type of image	Photography Drawing
	1.2 Content relationship	Yes No
2 Features of the body	2.1 Gender - Grouping	Man or men Woman or women Group of men and women Does not distinguish
	2.2 Colour or race	White Black Yellow Mixed-race or indigenous Several Does not distinguish
3 Physical activity performed	3.1 Thematic unit	Game and play Sports Gymnastics Dance Wrestle Adventure practice Several Others Does not distinguish
	3.2 Adapted activity	Yes No Does not distinguish
	3.3 Scope	Educational Recreational Competitive Does not distinguish
	3.4 Space	Indoors Outdoors Natural Does not distinguish
	3.5 Level	Elite Non-elite

Data analysis and processing

All 1,327 images were categorized by direct observation of the analysed textbook, a process that was divided into several sessions to avoid exhaustion errors. The ambiguous images about the type of physical activity represented were coded from the information provided by the text or paratext that accompanied them.

Based on this categorization and to investigate possible associations between variables, gender, and thematic units, we performed statistical analyses using: contingency tables; Chi-square test of independence; Cramer's V coefficient; and analysis of adjusted standardized residuals (Ben-Shachar et al., 2020; Onchiri, 2013).

The Chi-square test of independence is a non-parametric hypothesis test that, according to Soares et al. (2020), aims to analyse the degree of association between categorical variables by comparisons between observed and expected frequencies for a certain event. In this case, one can say that the analysed groups behave similarly insofar as the differences between the observed and expected frequencies in each category are significantly small (Everitt, 1992).

Cramer's V coefficient, in turn, is used to assess the magnitude (effect size) in the event of a significant association. According to Field (2013), this measure is based on the modified Chi-square statistic, considering the sample size and degrees of freedom, trying to restrict the amplitude of the test statistic to the range from 0 to 1. Table 3 indicates the classification for the effect size using this coefficient, proposed by Cohen (1988).

Table 3.
Effect size for the Chi-square test, Cramer's V and its interpretation

k*	Small effect	Moderate effect	Large effect
1	0.10	0.30	0.50
2	0.07	0.21	0.35
3	0.06	0.17	0.29
4	0.05	0.15	0.25
5	0.04	0.13	0.22

Note: *k=min (number of rows and number of columns in the contingency table) Source: Adapted from Cohen (1988, p. 79-80).

Furthermore, the analysis of Adjusted Standardized Residuals (ASRs) was used to verify the source of the observed association. In summary, given an ideal probability distribution, the ASR indicates the category that deviates from the statistically expected probability (Everitt, 1992). In this case, according to Mayers (2013), values greater than 1.96 indicate (significantly) more observations than expected. On the other hand, values lower than -1.96 mean that there are fewer cases than expected. Values between -1.96 and 1.96 indicate no significant difference between the number of expected and observed cases.

From the results obtained, it was possible to proceed to the exploration and discussion of each investigated category, by more expressive results. All analyses were performed with the aid of the R statistical software, version 4.1.0 (R Core Team 2021), which is free and easy to use. The adopted significance level was 5%.

Results

It should be noted that, of the initial total of 1,327 images, 51 were excluded since they presented missing data in some of the categories. Thus, a sample size of 1,276 images was established for the study. The analyses of the

first three hypotheses assume a predominantly descriptive character by the distribution of frequencies and percentage data. For these hypotheses, specific analyses are also evidenced, considering each publisher individually. For the other hypotheses, inferential analyses are performed to analyse the existence of statistically significant dependence between the variables.

Hypothesis 1: of the 1,276 images analysed, the exclusively male representation is the most frequent in Physical Education textbooks for primary education in Brazil ($f = 508$; 39.812%), followed by images with mixed groups ($f = 434$; 34.013%). The exclusively female representation was identified less frequently ($f = 334$; 26.176%), descriptively corroborating the acceptability of the announced hypothesis.

Specifically, considering the publishers, it was possible to verify that the ratio (r) between the quantity of images with representation exclusively of the male and female gender is higher in the Terra Sul publisher ($r = 1.831$), followed by FTD ($r = 1.724$), Boreal ($r = 1.313$), and Moderna ($r = 1.287$). As shown, in all the publishers analysed, it was possible to verify the preponderance of male representation in different proportions.

Hypothesis 2: the most frequent thematic unit in Physical Education textbooks for primary education in Brazil is sports ($f = 411$; 32.210%), followed by gymnastics ($f = 300$; 23.511%), dance ($f = 215$; 16.850%), wrestle ($f = 169$; 13.244%), games and play ($f = 129$; 10.110%), and adventure practices ($f = 52$; 4.075%), which makes us accept the stated hypothesis.

Specifically, in the books published by Boreal ($f = 43$; 34.959%), Moderna ($f = 152$; 34.943), and Terra Sul ($f = 192$; 34.347%), the presence of sports is more marked, with a representation greater than one-third of the images sampled. In FTD, sports is the second most frequent thematic unit ($f = 31$; 19.497%), behind games and play ($f = 41$; 25.786%).

Hypothesis 3: in 378 of the 411 images that showed people representing sports, it was possible to categorize the environment as elitist or non-elitist. Thus, we verified a small predominance of the first group ($f = 192$; 50.794%), in which people appeared playing sports in elite environments, over the second group ($f = 186$; 49.206%), which show people practicing sports in non-elitist environments.

Although not a considerable percentage difference, the analysis by publisher allows for a more significant distinction between categories. In Moderna ($f = 103$; 85.124%) and FTD ($f = 18$; 58.065%), images indicating elitist environments predominate. On the other hand, in Boreal ($f = 14$; 35.897%) and Terra Sul ($f = 57$; 30.481%), this type of environment is less frequent in the analysed images. As there is no uniform meaning in the descriptive results obtained, we conclude that the stated hypothesis is unacceptable.

Hypothesis 4: the analysis of the Chi-square test of independence indicated a significant association between the

thematic units and gender categories [$\chi^2(10, N = 1276) = 191.72, p < 0.001$]. According to the classification proposed by Cohen (1988), indicated in Table 2, this association showed a moderate effect (Cramer's $V = 0.2741$).

Table 4 organizes the descriptive information obtained and also presents the ASRs, which allow verifying the source of the observed association.

Table 4
Absolute number, percentage, and adjusted standardized residuals of images by gender and thematic unit

		Thematic Unit						Total
		Games and play (1)	Sports (2)	Gymnastics (3)	Wrestle (4)	Dance (5)	Adventure practices (6)	
Male	N	30	199	104	100	51	24	508
	%	2.351%	15.596%	8.150%	7.837%	3.997%	1.881%	39.812%
	ASR	-4.052	4.329	-2.082	5.520	-5.286	0.954	
Female	N	15	108	119	38	38	16	334
	%	1.176%	8.464%	9.326%	2.978%	2.978%	1.254%	26.176%
	ASR	-3.964	0.057	6.078	-1.172	-3.110	0.769	
Mixed	N	84	104	77	31	126	12	434
	%	6.583%	8.150%	6.034%	2.429%	9.874%	0.940%	34.013%
	ASR	7.865	-4.526	-3.489	-4.616	8.347	-1.700	
Total	N	129	411	300	169	215	52	1276
	%	10.110%	32.210%	23.510%	13.244%	16.849%	4.075%	100%

Based on the ASRs, one can state that five of the six categories showed a statistically significant association between the variables investigated (gender and thematic unit). Only the category of adventure practices showed no association.

In this aspect, from the absolute values found for this statistic, it was possible to infer that: the mixed category was predominant in the games, play, and dance thematic units; the male category was predominant in the sports and wrestle thematic units; and the female category was predominant in the gymnastics thematic unit. Thus, the stated hypothesis is partially accepted.

Hypothesis 5: considering only the thematic unit sports, in 406 of the 411 images analysed, it was possible to categorize it by type: individual ($f = 214; 52.709\%$) or collective ($f = 192; 47.291\%$). The analysis of the Chi-square test of independence indicated a significant association between this category and the gender variable [$\chi^2(2, N = 406) = 28.328, p < 0.001$]. According to the classification proposed by Cohen (1988), indicated in Table 2, this association was shown to have a moderate effect size (Cramer's $V = 0.264$).

Table 5 organizes the descriptive information obtained and also presents the ASRs, which allow verifying the source of the observed association.

Table 5.
Absolute number, percentage, and adjusted standardized residuals of images by gender and type of sport played

		Male	Female	Mixed	Total
		Individual	N 108	73	33
	%	26.601%	17.980%	8.128%	52.709%
	ASR	0.723	3.876	-4.759	
Collective	N	90	33	69	192
	%	22.167%	8.128%	16.995%	47.290%
	ASR	-0.723	-3.876	4.759	
Total	N	198	106	102	406
	%	48.768%	26.108%	25.123%	100%

From the ASRs, it is possible to infer that the female category was predominant in sports practiced individually and the mixed category in collective sports. However,

considering only the feminine and masculine categories, we perceive the predominance of the latter in team sports, corroborating the acceptability of the announced hypothesis.

Hypothesis 6: as evidenced in Hypothesis 3, in 378 of the 411 images that showed people representing sports in the investigated images, it was possible to categorize the environment as elitist or non-elitist. Of these, in 375 it was also possible to identify and categorize according to gender: male ($f = 175; 46.667\%$), female ($f = 96; 25.600\%$), and mixed ($f = 104; 27.733\%$).

The analysis of the Chi-square test of independence indicated a significant association between these variables [$\chi^2(2, N = 375) = 95.929, p < 0.001$]. According to the classification proposed by Cohen (1988), indicated in Table 2, this association presented a large effect (Cramer's $V = 0.506$).

Table 6 organizes the descriptive information obtained and also presents the ASRs, which allow verifying the source of the observed association.

Table 6.
Absolute number, percentage, and adjusted standardized residuals of images by gender and sport environment

		Male	Female	Mixed	Total
		Elite	N 122	58	11
	%	32.533%	15.467%	2.933%	50.933%
	ASR	6.805	2.155	-9.684	
Non-elite	N	53	38	93	184
	%	14.133%	10.133%	24.800%	49.067%
	ASR	-6.805	-2.155	9.684	
Total	N	175	96	104	375
	%	46.667%	25.600%	27.733%	100%

From the ASRs, it is possible to infer that the male category was predominant in sports played in elite environments and the mixed category in sports performed in non-elite environments. However, considering only the female and male categories, we noticed the predominance of images involving sports practices with male presence in an elite environment, corroborating the acceptability of the announced hypothesis.

Discussion

Hypothesis 1: *Male representation occurs more frequently than female representation in the images of Physical Education textbooks for primary education in Brazil* was validated. The data that place the male model as predominant are higher than those provided by González-Palomares et al. (2015) in Brazil, which indicated that men were represented in 38.6% of the images in Physical Education books, with similar results in Spanish studies, both in primary education (Moya et al., 2013, 2019) and in secondary education (González-Palomares et al., 2017; Táboas-Pais & Rey-Cao, 2012). These differences are likely due to the legal disappearance of gender-separated classrooms relatively recently (1990s) in Brazil, although these practices have not entirely disappeared.

The Lei de Diretrizes e Bases de Educação Nacional (Brasil, 1996) opens spaces for the construction of a school committed to citizenship and rejection of exclusion. These spaces are guaranteed and reinforced by the Diretrizes Curriculares do Ensino Fundamental (Brasil, CNE, 1998) that, by regulating the law, adopt as principles of education the guarantee of the rights and duties of citizenship, the policy of equality, solidarity and the ethics of identity. In an attempt to intervene in this reality, the Parâmetros Curriculares Nacionais (Brasil, 1998) of Physical Education, regarding gender issues, considers of fundamental importance the realization of mixed classes, as a opportunity for boys and girls can live together, observe each other, discover each other and learn to be tolerant, not to discriminate and to understand differences, so as not to reproduce stereotypically authoritarian social relations.

These data are far from the guidelines indicated in the BNCC on effective gender equality. In fact, in all publishers, male representation predominates over female representation, although in different proportions. This indicates that Brazilian publishers are not moving towards the implementation of the principles of equal opportunities established for textbooks. However, the data presented by Loro et al. (2021) are not confirmed in this study. These authors found a greater presence of mixed groups in the analysed books.

Hypothesis 2: *The most represented thematic unit is sports, in front of games and play, gymnastics, dance, wrestle, and adventure practices* was validated. In most images that refer to physical activity, they mostly represent sports. In Brazil, we did not find studies in this line of research, but in Spain, we identified a similar study in secondary education (González-Palomares & Rey-Cao, 2015), in which sports are more represented (43.4%) than non-sports practices: artistic activities (14%), games (10.6%), or adventure practices (9.7%). In this case, the images continue to show biased patterns of physical activity.

Sports maintain a hegemonic representation over the rest of physical activities. Nevertheless, in the case of primary education, the physical activities most represented in Spanish textbooks are perceptual-motor skills (19%),

although followed by sports activities (18%) (Moya-Mata et al., 2019). The two studies coincide when they indicate that the blocks of *body expression* and *adventure practices* are relegated to a considerably smaller presence in images analysed in the textbooks. In this logic, Physical Education teachers in secondary schools in Spain have shown that the *body expression* and *adventure practices* blocks are the least valued in the didactic content proposals (Robles-Rodríguez et al., 2013). Only the Brazilian publisher FTD did not present sports as the main physical activity in textbooks, but games and play.

Hypothesis 3: *The practice of sports is carried out mainly in an elitist environment* was validated. Concerning the level of practice, images of people associated with elite sports activities (Olympic games or sports competitions carried out by athletes or sports professionals) predominate, with a small margin. This aspect was identified mainly in the guides by Moderna and FTD. In the Boreal and Terra Sul publishers, images that represent non-elitist environments predominate (sports practiced on the streets, in squares, in vacant lots, that is, sport as a game and recreation without the presence of athletes and without assuming the logic of high-performance sport), coinciding with the results of another study involving the topic in primary education (Moya-Mata et al., 2019). In this general analysis of the level of practice present in the images, the authors identified that the non-elite predominated in 78.5% of the images, compared to 9.6% of the elite. Also, in secondary education, González-Palomares and Rey-Cao (2015) identified the predominance of images that reflect non-elite level practices (97.9%), with activities related to elite sports representing only 2.1% of the total sample. Finally, the predominance of activities far from elite sports corroborates previous studies on the analysis of images in Physical Education textbooks.

Hypothesis 4: *Female representation is related to the thematic units of dance and gymnastics; while the practice of sports characterizes male representation, wrestle, and adventure practices* was partially accepted. Specifically, the results confirmed that mixed groups were related to the thematic units of games, play, and dance; the male category to sports and wrestle; and the female category to gymnastics. Only the adventure practices category showed no association. We can say that Physical Education textbooks in Brazil reproduce traditional stereotypes around attributing a type of body practice to each gender. Similar results were found in the studies by González-Palomares and Rey-Cao (2015) in Brazil and by Táboas-Pais and Rey-Cao (2012) and González-Palomares et al. (2017) in Spain, with images showing sports in greater proportion with the male gender, and fitness and physical conditioning activities with the female gender. Therefore, the gender relationship of physical activity in Physical Education guides perpetuates the hegemonic values identified with masculinity and femininity (Klomstem et al., 2005).

In the case of adventure practices, all studies coincided, indicating that they are not related to gender. Alt-

though the literature suggests that adventure is more often considered a value for men, only the analysis by Moya-Mata et al. (2019) on adventure practices and gender present in the images of primary school textbooks in Spain proved that mountain sports are related to both male and female genders. On the other hand, male images are linked to snow sports, compared to water sports for female images. Despite being a good resource in the area of Physical Education for providing the development of values and positive attitudes in students, in addition to improving their environmental awareness, its representation in Brazilian textbooks has been little present.

Hypothesis 5: *Female representation is related to individual sports, while male representation is represented with collective sports* was validated. The results of this study coincide with those of González-Palomares et al. (2017), as they reveal a positive relationship between being male and playing collective sports and being female and playing individual sports. On the other hand, they also partially differ from what is exposed by these authors. Specifically, in the study by González-Palomares et al. (2015), the authors reveal that the images that show sports in Brazilian textbooks are more related to the male gender than to the female gender, both in collective sports (66.2%) and in individual sports (47.5%), indicating results similar to those found in Spanish studies involving these materials intended for secondary (Táboas-Pais & Rey-Cao, 2012) and primary education (Moya et al., 2013). The result of this study opens the door to equal opportunities between men and women regarding physical activity since, in a previous stage, images related to sports were only represented by the male gender (probably due to a historical-sports precedent); now, publishers seem to be starting to show women more involved in sports, but there is still a lot of work to be done.

Hypothesis 6: *Male representation appears more often in elite sports than female representation* was validated. The results of this investigation agree with those provided by González-Palomares et al. (2017) and Táboas-Pais and Rey-Cao (2012), involving secondary education in Spain. These authors found that, in Physical Education textbooks, the practices carried out by the sport's elite were related to the male universe. On the other hand, the data do not coincide with the findings of González-Palomares et al. (2015), which show the predominance of activities carried out without a high level of professionalization, represented by both men and women.

Conclusions

The images present in guides aimed at Physical Education teachers approved by the PNLD in Brazil, between the years 2018 and 2019, deviate from the balance in the representation of male and female gender in their relationship with the thematic units indicated for teaching in classes of Physical Education. In this case, we identified that more importance continues to be given to images linked to

the male gender, with sports predominating as the main activities in Physical Education, and in an elitist and professional environment.

The use of images in Physical Education textbooks reproduces a differentiated model depending on gender. The female model is characterized by the practice of individual sports – mainly gymnastics – and levels of practice excluded from the sport's elite. The male model is characterized by the general practice of sports and wrestle in competitive environments related to the sports elite.

In general, Physical Education textbooks in Brazil convey to students a biased sports educational model, which may influence the choice of future physical activities and consolidate their imagination based on hegemonic patterns present in society. But we can also say that we perceive a beginning of equality of opportunities in certain physical activities when verifying that the games and dances are represented by mixed groups of children.

The repercussion of this study is very relevant to its analysis of all the Physical Education textbooks approved in the PNLD, in 2019, for all of Brazil. Therefore, the results are universal and contribute to the Brazilian body of research.

We consider it necessary to continue increasing the knowledge about gender representation in textbooks and other materials that guide the pedagogical practice of Physical Education in Brazil and in other Latin American countries. In addition, the recent implementation of the BNCC raises a new question about the proposals for improving educational quality, and therefore it is important to analyse the results as a possible improvement for future Physical Education textbooks that may be approved by the PNLD.

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